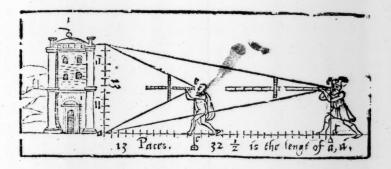
BOOKE NAMED TECTONICON,

Briefly shewing the exact measuring, and speedie reckoning all manner of Land, Squares, Timber, Stone, Steeples, Pillers, Globes, & c. Further, declaring the perfect making and large whe of the Carpenters Ruler, containing a Quadrant Geometricall: comprehending also the rare whe of the Squire. And in the end a little Treatife adioyning, opening the composition and appliancy of an Instrument called the Profitable Staff. With other things pleasant and necessary, most conducible for Surveyers, Land-meaters, loyners, Carpenters and Masons,

Puplished by LEONARD DIGGES Gentleman, in the yeere of our Lord, 1556.



LONDON, Imprinted by Felix Kyngston. 1634.





L.D. To the Reader.



Lebough (gentle Reader) many excellent in Geometry, apon infallible grounds, have put forth divers most certains and sufficient Rules, touching the measuring of all manner Superficies: yet in that the Art of numbring bath been required, yet chief-

ly those Rules hid, and as it were locked up in ilrange Tengales, they doe prosit (or have furthered) very little the most parts Certes nothing at all, the Land-meater, Carpenter, Chiason, wanting the aforeshid. For their sakes I am here provoked not to hide, but to open, and so encrease the Talent which I have received: yea, to public in this our Tongue very shortly (if God give life) a volume containing the slowers of the Sciences Mathematical largely applied to our outward practice, prositably pleasant to all mauner men in this Realms. In the meanetime I shall desire the Artisicers above named, to be econtented with this little Booke, a taste of my good will towards them) which I wish even so to further the Readers, as I know it sufficient for the true measuring and ready account of all mauner Land, Timber, Stone, Boord, Glasse, Pauement, &c.

Here mineaduise shall beeto these Artisticers that will prosit in this, or any of my bookes now published, or that hereafter shall be, first consuscity to reade them thorow, then with more indgement. Reade at the thirdreading, wittily to practise: So sew it ings shall be unknowne. Note, oft diligent reading, inyned with ingenious

practife, canfeth profitable labour.

Thus most beartily farewell (louing Reader) to whom I wish
my selfe present, to further my desire and
practice in these.

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THE PLEASANT PROFIT OR

content of this little Booke, and in what it exceedesh all other published.

Ther Bookes tofore put forth in our English tongue, contained onely the bare measuring of Land, Timber, and Boord: how agreeable in all places to the rules of Geometrie, let the learned judge. Here (gentle Reader) thou shalt plainely perceive through diligent reading, how to measure truely, and very speedily all manner of Land, Timber, Stone, Steeples, Pillers, Globes, Boord, Glaffe, Pauement, &c. without any trouble : not painted with many rules, or obscure termes, nor yet with the multitude of Tables. as heretofore hath bin: in which not a few errours were committed: for that cause no iust account might any way bee had. Further, ve shall by this Booke understand the whole making and comely handling of the Carpenters Ruler, with the true measure, &c. And his vie appointed to the ready measuring of all kinde of Timber, Stone, Boord, &c. Also the leucling of grounds, and taking of heights, is pleafantly and diucifly prachifed by the Ruler. Yee have here not the common, but the rare vie of the Square, applied to heights, lengths, &c. And to the finding of the iuft houre of the day divers wayes, through the aide of pleasant Tablesnewly adjoyned to my generall Prognoflication: by the which the proportion of things, direct or fquirewife standing, are by their shadowes knowne.

To conclude, in the end of this Booke is added a Treatife, fhewing the making, and vie of an Infrument, by which yee shall get lengths, heights, breadths, widenesses, where or howsoeuer they stand. Other necessary things are contained in this little volume, which I

Reader.



DIVERS THINGS

CONDVCIBLE TO THE ART OF MEASVRING.

The first Chapter.



b there are few Craftimen which have all the kindes of Arithmetike readily: lo 3 doe fuppole none fo ias nozant, but that they doe or may calily perceine the limple lignifications of thefe Characters og figures, 1.2.3.4.5.6.7.8.9. 10. And allo Church their frength in the firft, fecond, and numerall. third romes placed.

Defines that, they must bee familiar with thefe and fuch like fractions.

The first and in The first leftward betokeneth one fecond part of an whole, bet it Pearch, Inch, og any other meas Fractions, fure : the next, one third, then one feuenth part : the other enfuing one arteenth. So one thirty and two parts of an Inch. Then follow three fourths: foure fifths. The laft is nine tenths of an Buch : that is, nine parts of an Inch, biuibed into tenne portions.

Thele: I doe intend to put in my Eramples , and in my Tables and maraines following, to reprefent parts of Pears thes or Inches. As if I would write halfe an Inch, after

this manner . Thie quarters of an inch thus . Due cialt of a Wearch, on this mile ! Sont the til.

It is requitte alfo beere to open what a Pearch, a Dav

worke, a Roode, and an Acre is.

Although there are diners spintens engendeed through long cultome in many places, of the length of a Pearch boon which our chiefe matte: Dependeth) pet there is but one true Bearch by Statute appeinted to meafure by. Caberin is opained three Berly comes day and round, to make an Inche twelve fuches, a foot: three Foote a Part: fine Pares,

. a Pearch : foitte Pearches ia length, and foure in breadth, an Acre. So an Acre up flatute ought to containe 160. Pearthes, the balfe dere 80. Dearches; a Roobe, commonly called a quarter, 40. Pearches, a Day worke 4. Pearches. Loe heere the Acre expressed with his length and

2----80 3-1-20 10----16

Acre.

breadth.

meafere with Poales, Maffe.

I mult not omit beere to tell von what thing is meetelf to Infruments to measure Land with. They ble commonly in the countrey two Poales, either of them the length of a Bearch. They are bery good: pet for all kinde of Land, a Cord fine Bearches in Cord knotted, length, well feared with ware and rolen, knotted or marked at the end of enery Pearch, is more meete and readier. But in my fantalie, the instrument Scomerricall, which is put forth in the end of this Booke, paffeth them all and other, for the eract truth and gutckeft fpeed. This Inftrument is fo generall and auaileable to fo funday things, that it alone requireth a large Booke, if it Goulo be lufficiently let forth.

Triangle.

Alfo I would not have you ignozant what piece of Land is called a Criangle, which often thall bereafter bee named. It is fuch a fathioned piece as hath (or is imagined to have) three fiors, and three Angles onely: inhether the fives bee equals or otherwife, as this figure theweth. Againe, note that a line is faid to fall Squirewife, when it cutteth any thing, or any of a Triangle full croffe, like bnto a Squire : As the hanging

Line falling Squirewile.

pricked

priched line a. b. in s.d. the bale line of the Driangle. Loe it cuts teth the five squire wife, or full craffe in the power wand not as the other line with both. The tale of any Triangle is here called that line, which is cutsquires wife of the hanging line,

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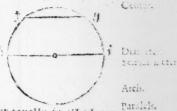
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Concerning a Civele, know, that the compatie of any office.
Circle is named a Circumference: the middle point in him his chemicales.

Center: the right line h.i. that goeth outerwhart that Center coaching the Circumference on both fives is his Diameter: the halfs of that line, the Semiofameter. Also an Arch is a piece of the Circumference cut away: as peefec the Archabout the line f.g. Also fig.h.i. in this Citele archabout parallels: for that they be



arenamed paraleis: for that they differ equally in all places,

the one from the other. .

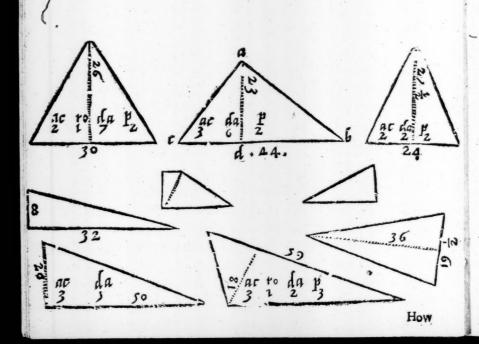
Rote because practile and experience sheweth me, that there is almost no Land, but it may easily be brought by imagination to a Triangle of Triangles, and so most truly measures: therefore, to be short, this order shall bectaken: I will first sigure and set asore your eyes Triangled Land, and other which by imaginations shall bee brought into Triangles. Then I shall teach the true measuring of them: I meane, how to since a length and dreadth, with which yee shall enter the table of account following, where the Acres and odde Pearches (if there bee any) shall appeare. As these sigures are measured, so all Triangled Land, and other brought into Triangles, of what sashion so ever they be, shall be measured. And because it is requisite for true measuring of all Triangles, to sinde a straight hanging line, I shall shew sirs how that line is to bee sound, imagined, or drawne,

How the right hanging line in Triangles is drawne.

The ij. Chapter.

To draw a hanging or plumbe line.

This straight hanging line in all Triangles is ever brawne or imagined from any Angle, cutting some one five of that Triangle squirewise: as yee may perceive the pricked lines in the Triangles following. By the below of this line, all Lands of Triangle sashion, are brought to bee measured as ensueth.



How to measure all manner Triangled Land.

The iij. Chapter.



If thou bee an Arithmetician, multiply this Euclidathe a freight hanging line, drawne, as about is Booke 41. profit which, in halfe the number of Pearthes of that five, which it cutteth Squirewife. For want of the knowledge, take the aforenamed Pears

thes (I meane of the hanging line, and halfe the fide which be cutteth) and with that length and breadth enter your table of account, as there is fet forth. So that ye perceine the number of Acres, Roods, Dayworkes, 3c.

Example.

The perfect measuring of Triangles afore figures, and all other, suppose the second of these last nine figures of the other side, having written about it a.b.c.d. to bee a peece of land, whereof I would have the true measure, I sinde by a Torde, otherwise, the pricked hanging line a.b. to bee 23. Pearches: the side b.c. which it cutterly squirewise 44. Pearches, whose halfe is 22. Thith these 22. and 23. the convenient length and breadth, I enter the table of account. There I sinde by that Table at the corner where both the lines of convenient length and breadth doe meete 3. Acres, 6. day workes, and two pearches to be in that Triangle. Thus of all before sigured.

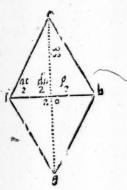
Pere note your Table must ener bee entred with all the This Table Pearches of the hanging line, and with halfethe storthat bee followeth. cutteth squirewise. Dr with the halfe hanging line, and the

whole five cut.

A figure of a double

Triangle.

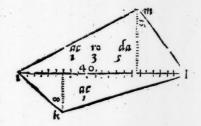
This figure c.f. g.h. is but two Triangles: and therefore measured as
about in two parts. Dr thus: The
hanging line c.g. is 33. Pearches: the
side f.h. that hee cutteth squirewise 20.
Pearches, the halfe of the which is 10.
Rowenter your Table as a fore, with 33.
and 10. the convenient length and breadth.
So thall pee finde two Acres, two Dayworkes, and two Pearches, the true content of this figure c.f.g.h.

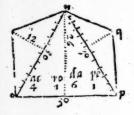


Figures of many Angles.

Another example.

A Dmit i.k.l.m. land to be measured. Because it is no masner Triangle, it must be brought by imagination, as I have said, into a Priangle of Triangles. Which imagination is heere signified by the line dashed i.l. Then as above is





occlared, it ought to bee measured (according to the rule of Triangles) in two parts, because there are two Triangles in that land. So by proofe ye shall find in the upper i.w.l. one Acre. 3. Roodes, and fine Dayworkes: in the other i.k.l. one Acre. Thus I gather the whole content of that Land, to bee two Acres, three Roodes, and suc Dayworkes.

12 one

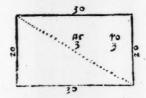
Mone otherwise of the adiopned n.o.p.q. and all other fi-

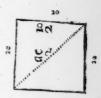
meanes may be brought into Criangles.

Furthermoze know that the figure i. k. l. m. is readily thus measured. Adde the Pearches of both the hanging Lines together: to have pee 23. With this number, and with halfe the Pearches of the side, i.l. which he cutteth squirewise, being 10. Pearches, enter your Table. So is found as a foze.

Their two figures following map allo bee thus measured, otherwise then by the rule of Triangles. Enter your Table with their connenient length and breadth. So shall you finde

the contents of all fuch.

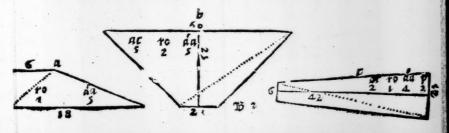




Thefe three figures following, although they may be meastured by therule of Triangles, yet for quicker speece, they have

alfo their proper mealuring as enfueth.

Lay together the two lives which are paralels of the first figure a. that is 6.4 18. making 24. the halfe is 12. the breadth 5. Enter with 5. and 12. your table. So have you one roode, and five day workes. For the other two b.c. and such like, forme the heads of ends in one 1 and enter your table with halfe of those Pearches, and with the whole number of the middle line.



How by supputation to measure all triangled land.

To measure triangled land by supputation.

Towne all the lives together: take halfe out of that halfe. Ipull cuery live, noting the difference. Then multiply the Differences, the one in the other, and the third Difference augment in the product. That which encrealeth, multiply in the halfe of all the fives toyned. Then the Ravir of the furmouns ting fumme is the content of that Triangle.

foure rules ollowing.

Row reft foure Rules to bee treated of. The first for all manuer Regular fquare Superficies. The fecond for round Land, and her parts. The third for Steeples, Columnes, Blobes, and their parts. The laft for Mountaines, and Clalleves. Dere they thall in ogder follow.

A rule for all manner Regular or right squared Land of many sides, as 5.6.7.8.9.10.20.100.&c.

The iii. Chapter.

Tomeafure land of many fides.



rule.

Calure and lay all the lides together, taking the halfe number of Pearches there contained. Then draw a right hanging line from the Center or middeft of that figure, or the middeft of fome one five. And with that length and the other, enter your Table. Dote that the Triangle of all fibes like, and the Quadrate figure are also measured by this

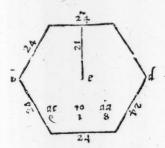
Ensample.

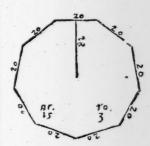
Cappole this figure a.b.c.d. to bee a fire fquare peece of Land, and every five 24. Pearches. The halfe fumme of

all lives is 72. Pearches: the right hanging pricked line a.c. 21. Pearches. With thefe two numbers ice muft enter pour Cable of account following bereafter. And Doe as is opened in the beclaration there adiopned, when Rumbers furmount the Table as they doe bere.

So thall ye finde 9. Acres, 1. Rood, and 8. Dayworkes, the content of this figure a.b. c.d. Euen thus is the other nine

fquared figures meafured, and fuch like.





A Rule for round Land, and the parts thereof.

The v. Chapter.



Alfe the Diameter multiplied in halfe the Circumference, theweth the content of any Circle.

De thus more plainely. Dee hallenter pour Archimedesin Cable with halfe the number of pearches of the menfurationis. whole Circumference or compalle, and with

the number of halfe the Diameter or breatth. So haue vee whe Content.

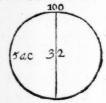
25 3

Example,

Example.

Suppose a peece of land, whereof the compasse is 100. Pearches, the breadth 32. Pearthes, I would know how much Land is in this figure. Enter pour Table with halfe the com-

passe, that is 50. and with halfe the breach, that is 16. Pearches. Because in the Table I cannot finde 50. so, the greatest length is 40. (therefore I enter with 40.) and 16. So is sound source Acres. Then I enter agains with 16. Pearches remaining, and 16. the breach as before, that



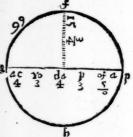
byingeth 1. Acre. Mow to conclude by addition of 1. and 4. A finde five Acres in that round Land, whole halfe compatte is 50. Pearches, and the breadth 16. Pearches.

How parts of Pearches are to be counted in measuring.

For perfect knowledge and ble of this Aable following, when parts of Pearches are adiopned, note well this other example that ensueth, and also what is sato of the declaration

annered buto the table, when parts of Pearthes are in the length, breadth, or both.

Amagine f.g. h. to be a round peece of Land: A finde by measure the whole Compasse, 99. 2 Dearches. The halle is 49. \frac{1}{2}. The hanging Line of halfe breath is 15. \frac{1}{2}. Enter your Table with the whole Bearsches, that is 49. and 15. leasures.



uing out 1 and 4. which were but parts of Pearches. So haue

pee 4. Acres, 2. Roodes, 3. Dayworkes, and 3. Pearches. For thole parts of Pearches omitted, at pour first entring the Table, worke thus. The halfe Pearch, Quarter, or other part of a Dearch in the length, muit bre rechoned by thems felues in the whole breadth, and those of the breadth contrariewife in the length. If there bee fuch odde parts in both, then recken them of the length in the whole breadth, and them of the breath in the whole length, forning to the other afore motten, remembring the product of the one fraction multiplied in the other, to bee pulled from the encreale. To make this matter plaine, I will take this laft crample before. The one number wherewith I thould have entred my table, was 49.1. the other 15. 3. I found first by entring with 49. and 15. (0= mitting the odde parts) 4. Acres, 2. Roodes, 3. Dapworks, and 3. Dearches. Row for the encrease of the parts of Bearches left out, I muft (as I faid) recken them of the length in the breadth, and contraribile them of the breadth in the length. Dalfe 15.4. is 7. Dearches, and 7. Ehie quarters of 49. is 37. Pearches .. Co bich abbed, makes 45. Pearches. This abiouned to the number aforegotten, bringeth the whole content of the round figure, which is 4. Acres, 3. Roods, 4. Daymorks, 2 . Dearches, and tofa Bearch, the product of the one fraction multiplico in the other fuboucted. What muft be bone when the numbers wherewith pee thould enter, ercrede pour table counsell the occlaration of your table there adjounce.

Of the halfe Circle.

Pothis halfe circle, enter the Caule with halfe the compasse, and with halfe the Diameter of the Circle, or with the length of the pricked hanging line, k.l. So the content of this halfe Circle is 2. Acres, 1. Roode,

ne to da # of a p

To measure halfe circled Land.

7. Day workes, 1. Pearch, and ... of a Pearch.

Another

Another example of Portions

and parts of a Circle.

Stippole n.m.o. following, were part of a Circle of piece of Land, who e Content reconfirm. The whole compasse of the Circle which this postion representeth, is (as aforesaid) 99. Pearches: his Diameter of headth 31. 4. The pricked Arkeof Compasse, n.m.o. is 74. Row with the halfe Breath of Semidianneer of the Circle, 15.4. and with 37. the halfe of the pricked Compasse: enter your Table. So have yee 3. Acres, 2. Roodes, 5. Day workes, 2. Pearches, and 4. of a Pearch, the Content of the piece of Land full of prickes, to the sides of the Triangle pricked.

To measure parts of circled Land.

Ifpe velire to know the lum of Pearches in the other pozition beneath the Triangle, lesparated by the Line m.o. yee must adde the Content of the Triangle (which is 3. Roodes and 4. of a Pearch, found by the Rule of Triangles) to the Acres and Pearches before searched. So have yea, Acres, 1. Roode, 5. Day works, three Pearches, and 4. of a Pearche.

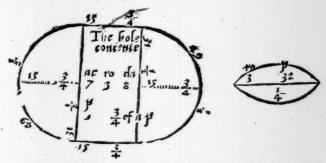


This substracted of pulled from the number contained in the whole Circle, the remaine is the Pearches included in the small peace beneath the Ariangle. That is, 1. Roode, 36. Pearches, and for a Pearch.

How mixed Figures are measured.

Land compounded of circles, or his parts.

I Thinke none now will boubt hold these two figures following are measured, because they are made of pozitions or parts of Circles, whose measure is before sufficiently opened, the one confifting of two halfe Circles, and a Quadrans ale: the other being the portions of the Circle, m.o. boubled.



If any enill fashioned Land chance to bee measured, which requireth to be brought into many Triangles, to fane labour, pee map abbe fome portion buto that , and make it Square, or otherwie. Do let them bee mealured: and after, from the product pull away that yee added: the remaine is the Coutent.

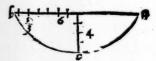
To finde the content superficiall of Steeples, Columnes, Globes, and their parts.

D the Arithmetician, I fay: for picked Steeples, mul- To measure tiplo the whole five in halfe the circumference of the Bafe, Steeples, Coadding the plaine of that Bale. For pillers : augment the Eir Globes, &c. cumference of the Bale in the Deights, putting to the plaine of both Bales. For Globes, the Diameter in the Circumference multiplied. Guen fo of fragments or parts. Let them that bee boibe of Arithmetike enter my Table of account following, with fuch numbers as I now willed the Arithmetician to multiply, not forgetting what I have before written. So I ferue their turne.

The Art of measuring

Or thus by the rule of proportion, the parts of a Globe are found.

To measure parts of Globes Suppose a.b.c. to bee a piece of a Globe, and 4. to be a proportion of the Disameter, the whole being 14. Thus I say, 14. the whole



Diameter giueth 616. the Content superficials of the Circle: what thall 4, bring: So haue pee 176. which is the Content of that piece.

To finde the Diameter by some knowne portion thereof.

To finde the vnknowne Diameter of a Globe. If ye bee ignozant what length the Deameter of the Globe is, whose proportion yes have, the height or part of the Demecient being 4, foot, augment halfe the line a. b. which is 6. in himselfe, and the product divide by 4. So have yee 10. to be added to 4. which maketh 14. the whole Diameter.

The true measuring of Mountaines and Valleyes.

The vi. Chapter.

To measure Mountaines.



Irth ye thall measure the circuit of the Foot, of Bale of the Pountaine: then the compatie of the summity of toy, adding them together. So thall ye doe of the Ascenses, that is, the going by from the foot to the toy, toyning the measure of the longer and thoster in one. Now take the halfe of the circuit added,

and the halfe part of the Accentes toyned, and enter you table : there thall pe fee the Content.

Ensample.

Ensample.

A.b.c. is the mountaine: a.c. the circuit of the Bale, being roo. Pearches, b.the top 16. Pearches. Which toyned toge-

ther, make 116. b.c. the one Alcense is 55. Pearches: the other 75. These added make 130. The halfe of the circuits is 58. the halfe of the Alcenses 65. with these two summes pee shall enter

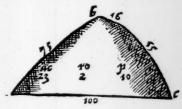


Figure of a Mountaine.

your table of account, where ye hall find 23. Acres, 2. Roodes, and 10. Bearches, the true content of this figured hill.

Of the Valley.

Sin the Pountaine pee mealured the circuit of compatte To measure of the Bale of Foote: so here contrary pee shall meete Valleyes, round about the circuite of compaste of the height of the Calley. And as pee got the measure of compaste of the top of the Pountaine, so measure the circuit e of the beyth of the Calley. In like manner as pee measured the Ascense, that is, the going by from the foote to the top: so measure the Descense of going downe of the Villed the beyth of the Calley. The rest all works, as I have shewed you in measuring the Pountaine.

For more plaineneffe, behold this enfample or figure. If yee lay together the circuites of the beight and depth, which is 210.



and 30. taking the halfe art of those two Circuites, making

Figure of a

Vailey.

The Art of measuring

an 120. then the two Accentes 140. and 60. added in one proseduct 200. the halfe thereof being 100. with this and 120. the other halfe of the Circuite, ye may enter your table. That voing, loe 75. Acres.

How the Table of account now following, is to be vied.

What is to bee done when numbers, with which you should enter, exceede your Table.

1 17 ben you have gotten a conucnient Length and Breadth (as I have aboue beclared by biners tris angles and other figures) then you hall enter this Cable. Secke therethe Length, and moft number of Dearches in the bigber margine, which beginneth at 1. and endeth rightward at 40. Looke the other fumme of Pearches (I meane the breadth) in the right five and hanging margine, from 1. Descending to 20. Row at the meeting of the lines, where the one answereth the other pirectly in a square, you thall ande the Acres, Roodes, Day workes, and Pearches. Rote that the firft number fet on the left five, and byper part in any fquare. fignifieth the number of Acres. The figure 1. let in the bover part, and right five, both betokena Roobe : the figure 2. there two Roodes. 3. three Roodes. And the figure in the left five beneath, fignifieth a Day worke, or Day workes. A figure in the lower part rightward, beclareth Bearches.

A Declaration adipyned.

the which ye thould enter this table, are greater then any here found: it behouse thou to take the halfe of the one, and the whole of the other, or what parts ye lift of both, most commodious for your purpose, and so enter your table. Looke then what is there found, and it hall beare his name of the parts multiplied in themselves.

Ensample,

Mountaines and Valleyes.

Ensample.

Suppose the number with the which pee Mould enter pour table to bee 130. Dearches in length, and the breadth 60. neither of thefe may be found in the Wargines: wherefore I take the third part of an 130. which is 34. Bearches, and ene

remaineth.

The halfe 60. that is 30. I finde with entring them at the Looke what I common meeting, 6. Acres, 1. Roode, and 5. Day workes, have flewed in This fumme mult have his name of the parte augmented in the Chapter of themselues. I tooke the third part of the one, and halfe the durfind here other number, therefore 2. muft be multiplied in 3. 02 centras of whole Pearrie : fo haue pe fire, which fignifieth that pe haue found by en ches, left inb. tring, but the firth part of the number pe fould finde, Calberg, Aracting, &c. fore I muft take this fumme tologe found (being Acres, 1. Roode, and 5. Dap workes) fire times as much. So haue ve 33. Acres and one Roode. For the Pearch remaining in Tenath, reckon him in the breadth (as is afore beclared) in the fifth Chapter of the Remaines: fo haue vec 60. Dearches more to be added. So the encrease of these two numbers, 103. and 60. amount to 38. Acres, two Roodes, and 5. Day workes. Thus any manner length and breadth is reduced to this table following, which fufficeth.

Thus with few words is ended the certaine meafuring of all manner Land, touching the Superficiall Contents. Witherefore now thall follow the true measuring of Timber. Stone, Steeples, Willers, Globes, according to their Craf-

fitube.

Such as are altogether ignozant of Arithmetike, may rece kon by our Englift come, allowing for cuery Bearch in length or breath a penny, and fo every Darke makes an Acre, every Doble halfe an Acre, euery forty pence or halfe Moble, a rood, and every penny a favare Bearch. And fo by memorie without tables, may in some rube and groffe manner, cast by reasonable inft the true Contents of all Closes, Dedowes, Parthes, Wils or Gallepes.

E 3

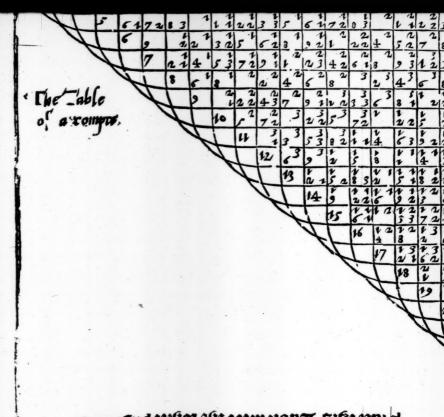
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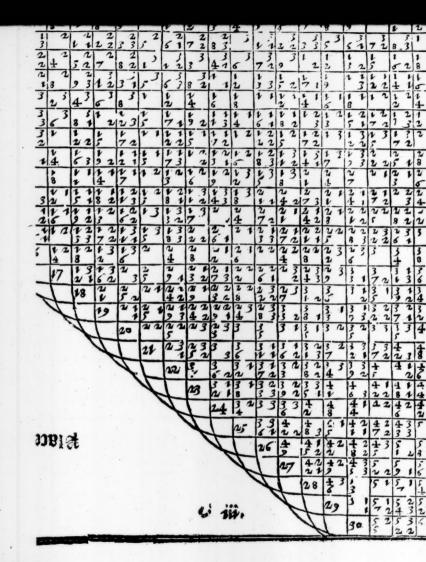
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To the Reader.



T commeth commonly to paffe, that Carpenters, Masons, and such like Artificers, are put either to measure timber every way square, or squared logs, broader on the one side than on the other: yea many times mutilate or vnpersect stuffe. Sometimes three, siue, tenne, or twenty, square in the head, and so through: oftentimes round

Stone or Timber with hollowed, &c. Afore I shew vnto them what must bee done with such pieces of Timber or Stone, to get their true measure, my defire shall bee that such Crastismen will leaue to be heady or selfe willed: yea so greedily to sticke to their

corrupted rules, that vtterly they refuse to be taught.

Both learning and experience declareth vnto me, that the grounds which the best of them have, are false. To open how and where, it needeth not: neither doth it appertaine to instruction, onely it may suffice him that liketh the true way, here to receive it appointed to him. Yet to satisfie and content him which will not beleeve any such errours or salse grounds to bee, Isay (and truely) that the Ruler of Timber measure, which the most part of them hath, is not made by right Art: Besides that, their crast in seeking the Square of some Timber is very salse. They wie in measuring, to lay the broader and narrower sides together in a summe, and to take the halse of that number for the Square. Then they seeke this vntrue Square vpon the salse Ruler, and so measuring the Timber, they conclude of it vntruely.

To the Reader.

In a foote fquare is contained 172. Inches, As this is corrupted, so are other Grounds which they take to be infallible. Now to the purpose: touching the correction of those Errours, with other not mentioned, whereby true meafuring may ensue, this way shall be taken. After I have opened how you must handle all such fashioned Timber (as afore is spoken of) there shall follow a Table in which yee may finde (as I will declare) the Square of any Stone or Timber. That knowne, it is requisite to have another Table immediately following, which may appoint to all true Squares from 1. to 6. inches, the just length to make a soote every way Square. With the length agreeable to your Square, your Logge must be emeasured. And as oft as ye finde it from the one end to the other of your Timber, so oft you may conclude the foot Square to bee contained in that Timber Logge, or Stone: that is, so many

Square Feet there to bee included. This Table of Timber measure standeth in the place of a good Ruler, well decked with true measures. By this yee may make or correct Rulers at pleasure, as after appeareth.

Now orderly followeth the true measuring of all fashioned Timber or stone aforenamed.



How Timber or Stone fouresquare enery way, or broader on the one side than on the other, is measured.

The vy. Chapter.



F a piece of Timber or Stone, bee either equally square, broader on the one story than on the other, yet shall take the such measure, I meane, how many Inches the broader side containeth: even so of the narrower. This done, yet must seeke in the Sable of squares following, the measure of the broader side of the Tim-

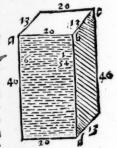
ber of Stone, in the opper margine of that Table. Then looke for the number of Inches, of the equall of narrower five, in the right part and hanging Pargine. At the common meeting where the one number answereth directly to the other, there your true Square thall appeare. This square so sound, shall bee referred to your Table of Timber measure: in the which you may plainely see (if you runne downe by the lest Pargine, butill your Inches square appeare) how many feet of Inches of your Ruler belong to a foote square. As often as that measure there sound, is contained in the Timber of Stone, so often and as many feete square yee may conclude (without doubt) the piece of Timber of Stone to have.

The Art of measuring

Ensample.

Suppose this squared Timber of Stone a. b.c.d. were to be measured, the broader side a. b. 20. Inches, the narrower side b. c. 13. Inches, the length 40. Inches. Now I must seeke the broader side 20. in the upper Pargine of the table. The narrower side 13. must bee found in the right side and hanging Pargine. At their common meeting 16. Inches,

and f. part of an Inch thall appeare. This true square must be searched so; in the table of timber measure. Therefore looke for 16. in the Wargine of this table. In the Squares with him rightward, ye shall finde 6. inches, and f. which is three quarters of an Inch. 40 Some deale lesse of your Ruser than 6. and f. laid out by on the timber, maketh a Hoote Square. And that measure so directly handled, is contained in the Length of your Timber sire



times. Atherefoze affirme fire Foote there to be, beside that is left in part of a Foote. Note because the Squares at all times (in this Ensample) rise not to even Auches, but sometime to odde parts: therefoze according to your discretion, adde or take away some part more or lesse in setting forth the Foote Square, as above is performed.

It were intolerable tediousnesse, yea impossible to set forth the true quantities of timber measure, to all odde Quantities of Squares. The discrete handling of these, the wittie shall bying to a sufficient exactnesse.

Of Timber or Stone, 3.5.10.20.03 moe fides Square, &cc.

The viij. Chapter.

then Timber hath vivers equall Squares in the head, and to the ough: first, measure all the square store and of the Timber.
Then take halfe the number of the whole measure for one breath.

Then measure from the Tenter (which is the middle of the head, opend of the Timber) to the middle of the Square side, betweene the two Angles, and take the measure of that distance for the other breadth. Now relock with the measures of these two breadths, (as tofore) to the Table of Squares: seeing the bigger number or breadth in the opper Pargine, and the other lesser in the side Pargine. With the square therefound, have recourse to the Table of Timber measure, and doe as I have instructed.

Ensample.

Admit this small piece of Timber fine square, e.f.g.h. thouso bee measured, every side being 12. Inches. If ye adde together in one summe all the fine sides, they make 60. Inches. The halfe is 30, that serveth for one breadth. Then the Line c.f. which goeth from the Center or middes of the Aquare, to the middle of one sides, is 8. Inches. The two number 30, and 8, must be sought (as before) in the table of squares following. At the common meeting, your square shall appeare 15. Inches, \$\frac{1}{2}\$. This square 15. Seeke in the Table of Timber measure. Here yee may be right with it 7. Inches and 2. Down because of 1 the of the same states.

7. Inches, and 3. Now because of 1. the odde quantitie of the Da Square



The Art of measuring

Square about 15. Inches, lay lomething lefte. Then fee how oftentimes that measure (so with discretion handled) is from the one end of your Timber to the other: and affirme so many times a Foote square there to be, as that measure is found in the length of your Logge.

How round and hollow Timber, Steeples, Pillers, Globes, &c. are to be measured.

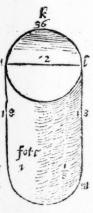
The ix. Chapter.

Arft gird the Logge round about with some Line: then divide the Line which compasleth that timber in two equall parts: keepe the one part for the bigger breath. After, ye shall divide againe that whole length (the two and twenty part cast away) in three parts, and take the halfe of one of them for

the other narrower breadth. Which the measures of these two breadths, have to your table, performing all things as afore is opened.

Enfample.

Suppose this little piece of Timber, i.k.l.m. were to be measured, the compasse of girding 36. Inthes, and the halfe of that is 18. being the one breadth: then the third of 36. is 12. the halfe of it is 6. which is the other narrower breadth, with these two numbers 6. and 18. enter the Table of squares following, and so the table of squares following, and so the table of simber measure. At the last (all things performed as before) yee shall since in this round Logge, the length 1. m. being 18. Inches, 1. Foote, and ½ part of a Foote. This is sufficient so all such like.



A note of hollowed Timber.

If it chance that hollowed Timber bee to bee measured: measure the whole Logge as though it were not hollow, as about is beclared. Then measure the narrower and broader sive of the hollow, and see what is contained in that, as though it were masse Timber. Now pull out the content of it, from the whole about measured: the remains of some must show what timber is included in that hollowed body.

I am buable in few words to expresse to the unlearned, by what meane Pyramidall, or picked regular Steeples of all fathions are measured. Also how Pillers, how the content of Globes or Bowles are fearched, unlesse the Art of numbring were tasted. That being knownerthus (as now followeth) I teach.

How the crassitude of picked Steeples is knowne.

Militiply the plaine of the Bale in the third part of the Height: so pee have the Crassitude. Or multiply the Content superficial (found as A have instructed) in the Beight of the Secople, taking so your purpose the third part of that product.

How the Content of Pillers

Engerease the Base plaine in his Altitude of Height: so How

The Art of measuring

How the Cubicall bodies of Globes

The content Superficial found, (as I have opened) must be multiplied in the sirth part of the Diameter: the probuct is that yee require: Dr the third part of the superficiall Coment in halfe the Diameter. Dr multiply the plaine of the Circle in the whole Diameter: then take two third parts, which added, make the Crassitude.

Of the halfe Circle.

His Superficiall Content multiplied (as I faid) bringeth the magnitude of him. If any man require ensamples of these last matters, or more sufficient handling: let them restort but omy bookes published of Geometrie, where they shall be satisfied. These little appertaine to Carpenters or Malous: therefore not by ensample vectored.

A generall note.

Denthou halt bee put to measure some Body, without other of fathion, lacking part of his Square, of having more than his Forme: if it lacke thou halt make it perfect, by observing visigently the running together of the stoes. The parts wanting hall bee measured, as though they were there, which portions must be taken from the whole Body measured.

Allo when there refulteth any moze than the fozine of Regular Square: firft mealure the fiquare Body: then the Craftube which aboundeth. All put together, doe shew the whole

irregular Body. This fufficeth.

A Table to finde the iust Radix or Square of any Timber or Stone.

behoveth you to know, that this table following is made for the true square of any manner timeber: thereoze understand that the numbers from r. to 40. set above in the high Hargine, betoken the

Anches of the broader lide of the timber. And the numbers from 1. and so downeward to 30, put in the right part and hanging Hargine of this table, signific the Inches of the narrower side: and to conclude briefly, the Clement or signres fet in enery square roome, betoken the full square. The bigger signres lestward in enery square place, signific the whole Inches. And the other lesser rightward in the same square divided by a line, the parts of Inches, as \frac{1}{2}, &c.

This first fraction toward the left hand, betokeneth one halfe part of an inch: the other two files of an Anch, and energingure of fraction having a point adioqued but o him, some deale less than that part is: as that part, i representeth scane halfe an Anch, a very little quantitie lesse. And if it had two prickes by him, he should have declared some quantitie more: as this other fraction of part, i which is more than two fifts,

a fmall beale.

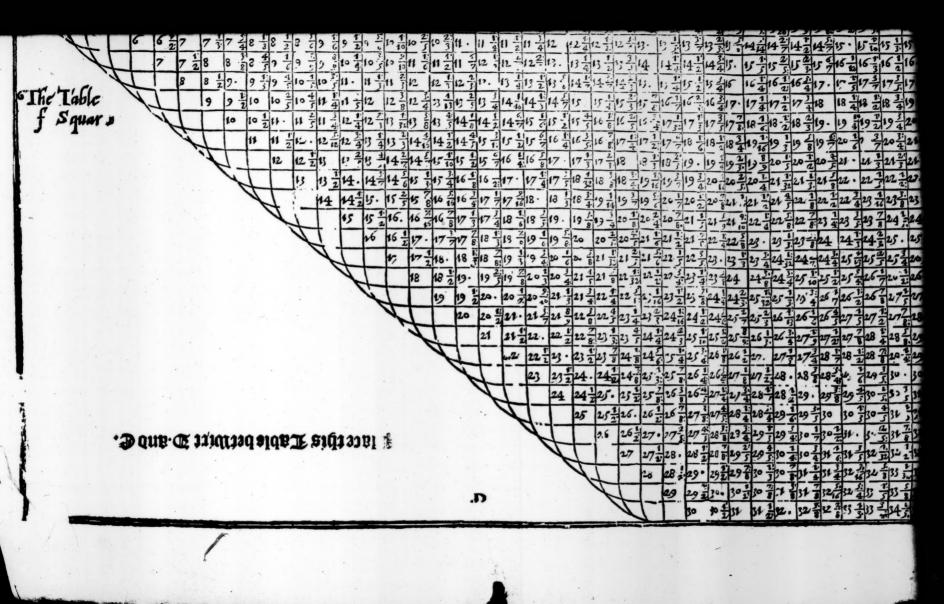
It had not been needfull to have put the parts of the Square so precisely as they are here: neither is it requisite so curiously to take them.

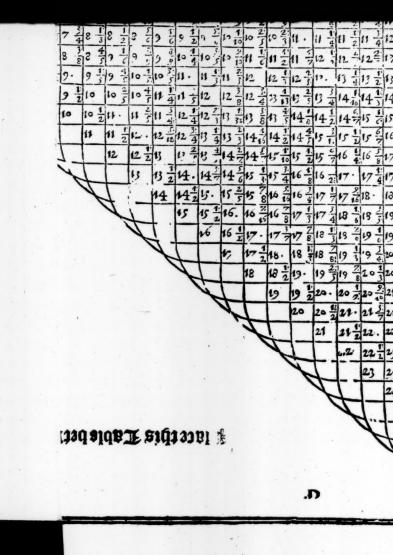


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The Table of Timber measure,

with the declaration and vse of it.

The x. Chapter.

This Table (aspec see) is divided into two Columnes of Rowes: the one bery short, the other longer. In the head of the sirst, I have put this word foot: in the second row, Inches, and parts to signific feet, Irches, and parts of Inches. The summes in the margine and lest part of the sirst and second columne, declare the quantitie of the square of Timber of Scone from 1.to 3%. Inches square. Which the rowes you map sind the sull length to a foot square, if pe enter into them in right of other according to the square.

Enfample.

Suppose the square of your Timber were 7. Inches, and that pee besired to know what measure or length of the ruler would make a Koote square: sceke in the lest margine, scuen Inches: and with him in that ofter toward the right kand, ye shall sinde 2. soote 11. Inches, and \(\frac{1}{2}\) of an Inch. Wote because the fraction \(\frac{1}{2}\) hath a yicke by him, it betokeneth some small quantities by him, it betokeneth some small quantities of positis thus: \(\frac{1}{2}\) it should signific some sittle quantities more. Resident makes it matter whether pee observe this pricking of no, the quantitie is so little to bee added of pulled away.

Mote what hath beene spoken of Timber, the same also is to be enderstood of from, likewise to be measured.

Thus is finished the measuring of Timber.
Now ensueth of boord.

Tables, Boord, or Glasse.

How Tables, Boords, Glasse, or any such like, are measured, according to their length and breadth, onely to the soot square.

The xt. Chapter.



his thing is performed by the helpe of a large Table following, divided in fire fmall Cables, and as many Pargins. The first and lest Pargin beginneth at 4. which is one quarter of an Inch, and extended to fire Inches, as ye may plainely perceive if ye runne downe by that Pargin. This hath his Table so

the right five adiophing but him. The other taketh his bestinning at fire Anches, \frac{1}{4} and endeth at ewelue, having his proper Table also. The third from 12.\frac{1}{4} to 18. And so from 18.\frac{1}{4} to 24: from 24\frac{1}{4} to 30. The last Pargine is from 30.\frac{1}{4} to

39. and there endeth.

Of this that is said, you may gather that every Hargin hath bis Table on his right side. Also you must know that in the top, and beneath, I have put (as in the Lable of Timber mealure) these words, Foot, Inch, and parts, to signifie, Kette, Inches, and parts of an Inch. Whenlocuer yee list to measure bootd, Glasse, or any other such, with the breadth of it, enter this table, and seeke that breath in his proper margin; there ye shall since in right order how many Keet, Inches, or parts of an Inch, belong to a Koote square. So often as the measure is in your suffe, instantant Feete bave pe in that Booto, or such like. If the breadth erceed this table, then divide the breadth in parts, and worke as is and shall be vectored. So the ingenious applieth this Lable sor all manner breadths, most eractly.

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The Art of measuring.

Ensample.

Sappole I have a pane of Glaffe, or a Boord, whose breath were 22. inches, the length 16. foot. In the fourth mategine, I finde this breath, 22. and t. And even with it in the table rightward, I see 6. inches, t. So much of my Ruler wan-

ting fome fmall quantity, maketh a foot.

Row because in the length of my bootd (which is 16, foote) that measure is found 29, times, and \(\frac{1}{2} \) parts: I conclude 29, foote there to be, and two third parts of a foote Square, according to the length and breadth I said (wanting some small quantity) because of the point in your to this fraction \(\frac{1}{2} \). Which is put to diminish the fraction some little thing, as is declared plainely in the other Tables before put forth.

Ho that desireth to measure chamber floozes, pauements, or such like, let him onely multiply the breadth with the length, so the product theweth the Content.

Ensample.

I # there were a pauement 100. foot long, and in breach 50. I must needs conclude by multiplication of the length in the breadth there to be contained 5000. foot.

Or thus without Arithmeticke, when the breadth exceedeth the Table.

D Buibe the breadth in parts (as is opened in the Declaration of the table of account) and worke as I have before
infructed. So for pavements all manner of wayes it ferueth
your turne. Of this matter to put forth tables, were superfluous cotousiesse and folly. The ingentous with these few will
be fatissize.

The Carpenters Boord measure Timber meadure Ruler. The face of the Carpenters Ruler, figured with the true measures, and other things necessary. The xy. Chapter. Bruler is aboue declared by tables, an inftrument alfo well 36 knowne & common among good 33 Artificers , I will not fpent 30 36 many words in opening it. Be- 27 bold the figures and learne by them bow yee ought to make and commonly to becke pour ruler, 30 both with timber and boost meafure. Ensample. 20 Admit the Ruler to bee a. b. c.d. well plained 12. Inches 19 2.11.2 1.8. 4 long, a quarter of an Inch thick, and two Inches in breadth. Truely it were moze commo- 18 20 bious, if it had two foote in length. This ruler bere ima: 17 gined, but a foote in length is 19 Diuibed firft in 12. euen parts called inches : then cuery inch 18 in halfe or two cquall portions : each halfe in two quar. 17 ters: euery quarter in foure o? 2. parts at the leaft : as in this 16 enfample. Then are the figures placed from 1. to 12. manife: 13 14:2 1.1. fling the Inches. Thus your 15 ruler is ready to receive the meas fures which are marken or fi= 14 gured on your Ruler thus. Abbe

first the timber measure as fol-

The Carpenters Ruler.

3782. Thall refort to pour table of Timber measure, and sceke how many feete belong to one Inch ber note, write, or rather graue, where this fi 5 me caure i. representing one Inch, is figured as ve map fee in the miodelt betweene the line e.f. and the line of the figure g. h. This done, relost to pour table againe, and be: bolo bow many feete and parts two Inches fquare requiretb. Do Chall pee finde 36. foote , which is placed in the nere roome leftward, bnber the Character 2. fignifying two Inthes. Thus the reft, feete, Inches, and parts, found in your table, butillyou come to the 12. Inch, where pee thall perceine twelue Inches onely to bee fet in his proper roome, de. Thenfeeke further in pour table what belongeth to 13. Inches. Loe tenne Inches and ! This muft bee numbred in the line c.d. from c. which line betokeneth the thickeneffe of the Ruler. Dake there a little frike bpon that groffeneffe, euen or right against the measure 10. What neede many words & Thus doe butill pou come to 36. Jaches, and that is noted (as the table of timber measure theweth) right with one Inch and from c. 120 otherwife is performed of boord measure. as ve may behold fet forth by the belue of his proper table

as pe may behold fet forth by the belue of his proper table in the Square roomes beneath the line c. f. and also the other thicknesses

02 line b. 2.

The backfide of the ruler. re of leanel.

The backfide of the Ruler, with the quadrant Geometricall.

The xiy. (bapter.

Dis other figure i.k.l.m. The making of is the backfloe of your ru= s fer, haufing in the middeft of Deometricall quadzant n. o. p. q. whose making in few words is thus erpreffed. The line or breabth of your ruler n.o.the line o.p.p.q.q.n.ought to be of one equall fult length, cutting each other fquirewile. Note thefe And from the center n. bnto three principal p. is drawne another line, lines. which is called the line of beight. So is o.n. the line of eleuell. q.n. the line of beights byright. This knowne, 3 open my compatte, one foot remais ning. In the center n.the other extended in the line of leucil almoft to o. making a circum= ference to q.n. which is a poz= tion of a circle named a quas Diant, and ought to be binibed into 90. equal parts, as pe map behold, every of them called a degree. Dee may divide the lines o.p.p.q.named the Scale fides o.p. and each in 12.as bere, og in 60 pea p.q. are called in 100 equal postions is more the Scale. meete for the ble of habowes. beights, lengths, ac. Dote that the five or halfe Scale, o.p. is called the contrary habow p. p.right hadow. Remember that boon the thickneffe m. k. pee ought to have two fine equall (quare fights wel boget,

represented here by r.s. made of wood, or rather mettall to bee

a Geometricall quadrant,

The Carpenters Ruler.

The common vse of the Carpenters Ruler, touching the Face afore put forth.

The xiii. Chapter.

The eight Chap. theweth how the true fquare is found.



Appole a piece of timber to bee moaten, whole true fquare is 7. Inches, this fquare appointed pou to the figure of 7. in the line g. h. bnder whom rightward in the place affigned to Time ber mealure is written 2. foot, 11. Inches, .. As

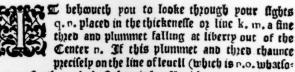
often as that measure is found in the length of your timber, fo many foote of timber is in that piece.

Another Ensample.

I Magine your Square to bee 23. Inches : fecke in the line La.c. Rote then how much of pour Ruler is left from that to the end of pour Rule c. and fo much belongeth to a foote. Therefore lay out the measure bpen your timber, and reckon how many times yee may finde it, from the one to the other of pour Logge: fog fo many foot of timber is there. Quen thus of boord. Deeke the bredth byon your Ruler, in the roome or place of boord measure, and immediately before your eyes there res maineth what is to be laid out to make a juft foot of booto.

The vse of the principall lines in the Geometricall Quadrant on the backfide of the Ruler, and first of the leuell line.

The xv. Chapter.



ener pe fee through the lights, is levell with your eye, if others

wife the thing that yee looke buto is not levell, either moze or level then the height or levell of your eye: Poze, if the Plummet fall to you ward: leffe, if contrary.

How by the line of Leuell to forsee whether the water of any Spring or head is possible to bee brought to a place appointed, and also to judge the wholesomnesse of it.

The xvi. Chapter.

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lo: er: E thall goe to the head or Spring, and fet your Ruler to your eye (being in height equal with the water) fo that the fine cord and Plummet fall precisely in the line of levell. Row if through the fights ye may see above the place, know and

indge the water possible to be brought: if your sight fall boder, impossible. It commets commonly to passe, when the place to the which yee would have water conveyed, is of any great distance from the head, then Hilles, Classeys, and such like impediments, let the line visuall to have his free course: where fore this remedie is provided. At the head of the spring, ye shall boke thorow the sights (as before) and note a marke in the next Hill toward the place, then goe to the marke in like manner observe another in some hill: so south whill by any of them yee may perceive the place vesired. If then your sight running through the pinness of your Ruler (the three ever failing on the Line a.d.) creede that place, the conveying of your water is possible. Otherwise not.

Dow by the way briefly yee thall bee intructed how yee may

know the wholformeffe of water.

How good water is knowne.

Take a cleane pot, and put water in it: so set it on the fire:

after a little boyling, power it out, if then no filth remaine

The vse of the Scale.

maine in the bottome of the pot, it may bee iudged the wholes fomer. De thus. Let fall drops byon metall, or rather on Glaff (any of them being polifice) and luffer that to drie by it felfe: if after there remaine no fpot of ligne, it is a good token. Odeconer, if your water bee sweete, pure, cleare, light, or of little weight, it followeth the water to bee whole some for the bie of man.

Of the Line of height.

Densoeuer the Theed and Plummet dos chaunce infly on the Peight, which is n. p. the Altitude of Peight that pee fee is even with the diffance from the middle of your Foote, to the nether part directly under the toppe, equall with your flanding, adding the Peight of your Tye downeward. Know that yee must ever stand byzight with Bodie and Mecke, your Feete inst together, the one Cyc closed, &c.

The line of vpright Altitudes.

Thoge also any thing plumbe byzight when the thicknesse of your Ruler i.l. is closely thereon, the plummet then at Liberty falling on quanamed the Line of heights byzight. Now followeth the vie of the Scale.

To search out Heights by the Scale with the aide of two places.

The xviy. Chapter.

Et the Thred and Plummet fall in the one, on the 12. points: in the other Station, on the 6, of the right Chaddow: bouble the distance betweene the two places, the summitte appeareth from that part of the thing measured, which is equall in Peight with your ever

eye. Dy the one in the 12, the other in 8, of right hadow; then triple the dictance. The one in 12, the other in 6, of right Quadruplate, the space. The one in the 12, the other in 6, of the contrary hadow, then the space betweene both the Stations is equall with that yee measure, ever understanding from your eye upware. Even that same commeth to passe, if in the one the Theo bee found upon the 6, of the contrarie, in the other on the 4, of the same, of the 4, and 3, of the contrarie. In all these the spaces are equall with the Altistudes. So then in measuring the distance betweene the two places, yee have the height from your eye upward, putting to if the length from your sight downeward, the whole Aktitude appeareth: the Base being equall with your standing.

I would not have your ignozant here how to know lengths How lengths which be in height not easte to come unto. For (as before) in height are get the height of the toppe, the Altitude of the Bale or long-knowns. est part of your length. Subduct the less height out of the more, of force your vestred length remaineth. Or thus: Let the plummet and thred fall in the 12. Parke your place: goe in toward the thing (the thred as it was) untill yee see the Bale of that length: the distance betweenethetwo standings, is

budoubtedly the Length.

How with Scale direct or vpright heights by their shadowes are declared.

The xix. Chapter.

Three your left live but the Sunne, suffering his Beames to pearce both your sights q. r. placed (as afore is said) in the thickenesse or line k.m. The Three or Plummet then hanging at libertie, out of the Center n. sheweth as well the Degrees

f 2

of

The vse of the

of height to bee counted from 0, as the parts of the Scale cut-If your thied bee found in the 12, part of line of levell, that downs of all things being perpendicular clevated, are equal with their bodies. If the pluminet with the thied bee perceived, cutting the parts next to the fights, which I name points of the right thadow, then every thing direct is more then his shadow, by that proposition which 12, exceeded the parts, where the thred was found. If it fall in 1, that is the first part of the right thadow, take the shadow twelve times, to make the height. In two, that is the second part, sive times, in the third, foure times: in the fourth, three times: in the sife, twice: and \(\frac{1}{3}, \) of the shadow, in the sire, twice, in the second \(\frac{1}{3}, \) in the eight once, and \(\frac{1}{3}, \) in the eight once, and \(\frac{1}{3}, \) in the tenth once, and \(\frac{1}{3}, \) in the eight once, and \(\frac{1}{3}, \) in the tenth once, and \(\frac{1}{3}, \) in the cleventh be shall take the shadow once, and \(\frac{1}{3}, \) in the cleventh be shall take the shadow once, and \(\frac{1}{3}, \) in the cleventh be shall take the shadow once, and \(\frac{1}{3}, \) in the cleventh be shall take the

Right shadow. If the Art of numbring were had, I would will you to multiply the length of the shadow by 12, and the product duite by

the parts, in the which he found the theed.

But if it bee in the parts of the contrary Madow, augment the length of the Madow with the parts declared by the plummet: and the increase divide them by 12. so commeth the Altitude also.

Thus the composition and whole appliance of the Carpensters Ruler is thewed: therefoze somewhat thall be now fait of

the Squire.

dow.

I am not ignorant that the common ble of him, is better knowne than I can with many words expresse, wherefore I leave to write in that behalfe. Notwithstanding I will occlare how Peights and Lengths are taken, &c. matters rare and knowne of few Artisters.

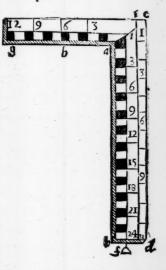
Allo by Cables to get a true knowledge of the day houre, and that diverle waves, with the helpe of the Squire, as is opened in my generall Prognofication, augmented in the yeere

of our Lozd 1556.

What length the fides of thy Squire ought to bee, and the diuision of him.

The xx. Chapter.

I Reeve not to put foozth I the exact making of 12 this Inftrument fo well knowne. Lo therefore the 9 figure. Due five fupvoled two foote from the inward Angle: and the other a full foote from the fame. The longer a. b. inward= Ip dinided from the Angle a. bnto b. into 24. equall principall parts, and cue: ry of them into a leffe (if pe lift) each containing 10, minutes, also the fibe c.d. in the outward contrary, plaine from the top c. bn= to d. is divided into 12. e= uen portions: and againg (if vee require cracinelle)



every of them into 6. each of value ro. minutes: Behold a line and plummet falling from c. to f. a Parallell to c.d. and s.b. Thus this squire is well framed for the vie of swers Asbles put forth in my generall Prognoffication, and also for the finding of Altitudes and Longitudes, which here I purpose now briefly to open.

How by the Squire heights are knowne.

A Leitudes or heights are found, the line or plummet centred in the firt point, cutting h. the middle of a.g. The moveable

The vse of the

moneable fights placed in a. g. of a paralell from that line not buike, as is opened of the line of height, in the backe of mp Ruler.

How Lengths in plaine Groundare fearched by the Carpenters or Mafons Squire.

The xxi. Chapter.



The a staffe divided into certaine portions as yee list, in a 100. or a 1000, parts. At the beginning of your length, byon the very toppe of rectly standing, set the inward Angle of the Squire: lift by or put downer this instrument.

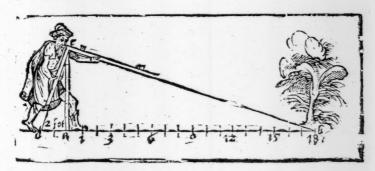
butill you fee the furthest part of your Longitude, I meane butill your sight running from that Angle, to the end of your Squire, come buto the furthest part of that length. The Squire so remaining, and the Staffe not remooned from his height. Parke where the other end of the Squire nert buto you noted byon the ground. See what proportion the Staffe then beareth to the part of the ground, which the neerest end of the Squire pointed buto from the Staffe: the same shall the Length have to the quantitie of the same Staffe.

Ensample.

The cause is taken out of Euclid.33. pro. 1.Booke and the 4. pro.6. booke.

The Staffe a.c. in this figure is imagined 6. Koot, and the space a.d. 2. Koot. Considering now that 6. the length of the Staffe containeth 2. thice, therefore the Longitude veliced, a.b. of force must containe three times the Staffe (which Staffe is 6. Koote) that maketh 18. Koote. As this is produed true by a small ground in the figure following: so the Art faileth not in a greater space, which the good Speculator

Speculatoz and villgent Pzactifer by any way cannot venie. Det experience willeth me this to confeste, that the Squire is not convenient foz any long visiance, but the Instrument Geometricall (whose making and vie yee may perceive in the Treatise following) volcife yee ascend some Tree of Turret foz your ayoe, which length knowne, thall stand in stead of your Staffe.



A Note.

To behoonethyou to have a fine cord, made fast in the opper part of your Staffe. c. which thall bee tred even with the inward edge of the Squire, and so drawne to the ground, where the neere end of the Squire from the Staffe pointed, as ye see, d.c. the other end then truly directing to the furthest victance.

Know that the ground must be very plaine and levell, other

wife erroz enfueth.

Thus the vie of the Squire is heere somewhat verlared, but more in my generall Prognostication, yea most plentifully hereafter (God sparing life) in a Booke titled, The rare vie of the Squire in practices Mathematicall. In the which Booke profitable pleasant experiences shall be eplainely opened (onely of me practice) as well of Perspective, as of the Pathematicals in generall.



A little Treatile, declaring the making and vse of an Instrument Geometricall, so farre as it furthereth the Landmeater

or Carpenter, named the profitable

To the Reader.



Said in the beginning, that no little Booke would containe the making and manifold fruites of this princely Instrument, if it were set forth as it ought to bee in his perfection. Certes the trueth even here maketh me confesse the same: yea that there

is no Instrument so generall and profitably pleasant: Notwith-standing know (gentle Reader) that the occasion of his chiefe vie and profit is not heere ministred: neither, to say the trueth, doth it appertaine to, or agree with the capacitie of such Artificers. Therefore I shall leave to intreate of his ample large vie and best making, and will set him forth in sew words: yea sufficiently for the Land-meaters capacitie or Carpenters purpose, that at the least, they may receive some kinde of fruite with the Geometrer. And in time to come (by other meanes) as I see cause, I will largely declare, and there decke him with his

proper beauties. Here now followeth the making, and fo briefly, how he is applied for the profit of the afornamed Artificers.

The vse of the profitable Staffe. 23

The making of this profitable Rodde or Staffe.



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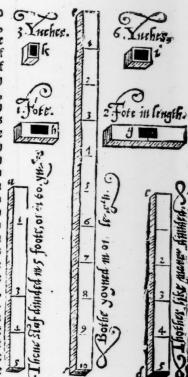
Ec

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E thall prepare two fmall, fireight, fiffe, round, or rather square rods of mettall or of wood, well plained of

like bigneffe and length. Although it make no matter of what length, pet to anoide the errours, which little inftruments, and Most fanes bring, and also to beare with the ruve unwonted handling of fuch Artificers: let our Robs bee cach fine, or at the leaft three foote, and etterp foote bigibeb in Iz. euch parts of Inches, as pee fee a.b. and c. d. Thefe Roos muft bee forgeb with a boyce in the end of them to topne readily tenne or fire foote in length, (when time requiretb) as the figure c. f. Geweth. Alfo pe muft get (bp the belpe of fome Craftiman) foure other like Roos, 33 the longer g. 2. Foote: the nert h. 1. Foote: the other 1.6. Inches, then k. 3. Inches, the laft and Chorteft 1. 1. Inch, and . Gach of thefe mult baue in their mibbeft a bole, that the long faffe of ten foote may bee put through them, and they moued

on him at pleasure by and bowne, alwayes cutting the longer staffe c. f. Squirewife, and made to tarry on any division,



ag

The vse of the

as occasion thall be given: which all are easily to bee perceived by the figure following, although my rude declaration hath not

expreded my meaning.

Here note in the Cead of your Chort Caues, yee may have one croffe flaffe two foote long, with current lights, so artificially made, that alwayes the Chort Caffe Chall runne squire byon the longer, and the lights distant, as ye list to place them.

Things needfull to be knowne before the vse of this Instrument is opened.

The y. Chapter.

Efore I intreate of this vie, it behooveth to know

things necessary, and first which of the fine little flaues g.b.i.k.l. mentioned in the making is to bee put byen your long flaffe e.f. according to the difance of the marke. Dote if your marke be neere hand, be it Tenath, breath, or heigth, the longer g. both feeme meeteff to have the roome, if more of length, the other h. and fo the further villance, the Morter the faffe requiret to be, which shall occupie that place. Oft practife theweth this better than maup words. Alle note, if chance bee to goe in toward vour marke, (as after pe thall fee bow) you must remoue the fhort flaffe inward more neere to the end of the longer e. If pe bee compelled to goe from it, then put it from e. toward the end f. Alfo remember when ye are appointed to measure any breadth or length (as thall be peclared) it behourth you to frand right with, and against that breadth: yea, and the longer the breadth og larger the wideneffe og length is, the better the thing will come to paile. And for heights it is necessary (if yee regard all precifenelle) to have the height fland birectly bp.

Note this that followeth to be generall

in all workings.

Y E must stand right by with your Bodie and Mecke, your feete instrugether, your hands not much moung, the one

eye closed, and ener marke your flanding right with the mioft of your feete. Bee not ignozant here, that I call the extremes What thefe of the little flaues, the very ends where the fight ever run- words meane, neth. And no difference betweene the Altitude and beight, bes Latitude. tweene the Longitude and length : the Latitude and breadth. Alticude The Mort flaues I name by the letter figured ouer them. Dour epe must ever bee placed in the end of the longer staffe e. and with the other eye pe ought to winke.

Thefe trifles and fuch like omitted, letteth the trueth to come to palle, and make men to suspect the Ground, which is

moft certaine.

How heights standing directly vp, are measured by the instrument.

The in . Chapter .

Tit the flaffe g. byon the longer c.f. and moue him his inft length from the beginning of the longer e. turne the ends of g. toward you, and according to that height placing your eye (as is faio) ener at the beginning of the longer c.

with the other eve winke. Then go backe butill pe may plainly perceive the very upper part of that Altitude, and also the lower end by the extremes of your forter faffe g. Row the space of the misole of your foote to the base of the beight is equall with the Altitude.

Or thus.

When ye thall fee any Altitude, whose measure yee require, imagine by confecture how oftentimes that height is found in the frace from it buto your standing. Then moone your thorter ftaffe (chofen as about most convenient) euen as often his owne length from the beginning of the longer c.

where

The vse of the

where your eye is ever placed. This done, turne the ends of your little flaffe, your eye being in c. according to the height: looke whether yee may fee by the extremes of your flogter the bery top, and also the lowest part of the height. If not, move the shorter a length further toward f. or neere to c. as yee see cause, and as your consecture sailed. Or let your little staffer remaine, as by consecture hee was put, and goe toward or from that height, butil the Alticude agree suitly with the extremes of your short staffer. Then marke that place with the middest of your foote.

Row ye may conclude, that the height is as often contained in the diffance, which is between the marke and it, as the length of that little staffe is found remodued from the end of

the longer, ac.

Ensample.

How the just height is knowne. If the thost flaffe bee tenne times his owne length from e. affirme the height contained in that diffance ten times only.

The Alitude is thus gotten. Booue vour hoit faffe from his late being a length either toward or from c. as pee lift to goe in og backe. Then goe fro og neere unto it (as befoje) bn= till the very fummitie, and also the lowest part of the bright agree with the extremes of your forter faffe. The tpace then. betweene pour marked place and this latter, beclareth the inft beight. Oftentimes through impediments, vee thall not haue roome to goe fo farre backe or forward, as the beight commeth bn'o. This remedie is prouided. Moone the kitle Staffe halle his length, and fo fceke two Stations (as before) butill the extreme of the Moster flaffe bee found tuftiy to ans fwere either end of the beight. Then the fpace betweene the two flandings muft bee boubled to have the full beight: or if ve lift, vee may moue the footer, according to the fourth part of his length, or to any portion, as to the fift, art, twenty, ec. then thall per haue that part of the beight betmeene the two Pations.

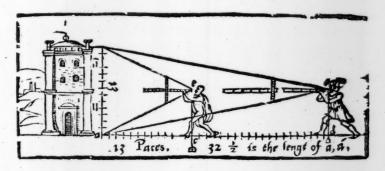
A remedy prouided for want of ground.

Det know this (which experience by biligent practife will thew), the bigger parts per take, the leffe errour ve comme. &

little erroz often multiplied, enercafeth to a great.

Dow that all the aforespoken may the better bee perceitted, The ground of behold the crample infuing, as pee may c by figure declared, this may be gain the wh ch the height is imagined a.b. the first flation c. the thered of Eu-thore flaffe g. is mouted from e. full his leng h. I am forced to fpectine, conclude, that the Bale of the height a.b. is from my flanding 21. Theo. c. quen bis precife length. So then if you meafure that Dis fance of a.c. being 13. paces, pre haue the true beicht of a.b. as many. Tu the other franding place c. the fortelt fleffe is found from c. twice his length and a halfe, wherefore 3 muft affirme the beight a.b. to be contained or found in the biffance a.d. twice and a halfe: which length a.d. is apparent 3 2. paces. All this that is spoken of the height, may well bee bider food of Latitudes or widenelles, and lengths following.

In Altitudes this rule is not perfect, except the eye be level with the middle of the Altitude.



The vse of the

How the breadth or widenesse of things are found, and by them, Length or any distance at pleasure.

The tiy . Chapter .

the same understand here of widenesse, lengths, ac.

For none otherwise are Latitudes or widenesse, so because of heights, oncly this excepted, that the soulared of heights, oncly this excepted, that the short staffe must lie contrary, the ends according to the breadth, seeing by the extremes of the short staffe, the very uttermost parts or ends of the Latitude, noting your stations right with the smost of your foote. And so I said, thereof the parts of the height found betweeneyour standings, even the same things is well view here, so all manner parts of the breadth.

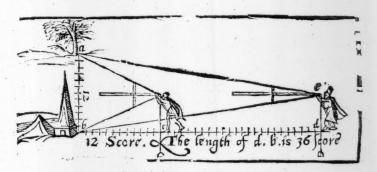
Ensample.

The breadth in this figure following supposed a. b. Also the first station c. the next d. Dy bestre is to know the widenesse a.b. and the length of distance d.b. Barke how the ends of the lesses are turned to the extremes of the widenesse. Then behold how the short staffs in c. is but once his length remodued from c. This refore (by the instructions of beights asofe) he may boldly say, that the widenesse a.b. is but once contained betweene d. and b. and that measure is found 12.score, as much as is the other a.b. In the second standing d. the little staffs is remodued three times his length from c. For that cause A conclude (and truely) from b. to that station three times the breadth, which breadth is 12.score. So by the widenesse I have sound the length of b.d. 36.score, my desire. Thus are Latitudes sound, and by them lengths, &c.

Behold

Behold the figure.

Ye must alwayes stand directly against the middle of the Breadth.



Mhenfoeuer any diffance is put, whole certaine length vee require : measure (by the art expressed) either the height of any thing there found, or the breaoth, and fee bow oftentimes that wideneffe or length is contained buto pour fanding : which knowne, the length cannot be bid, as is beclared.

TOw infewwords to conclude, yee may by this Infirms Amore larger ment measure the distance of boules, Steeples, Trees, vie of this la the length of Calles, the breadth of Ditches, Images in frument. beight, and fuch like. The good wittie Carpenter fanding in a place, where her may plainely fee a whole house, or any manner frame with great pleasure, may by this get speedily the true proportion of that house, which hee ought to note in a Table, and when time commeth (not without his great praife) may make, reare and fet up the like. This 3 take to be lufficient for thele Craftimen.

The vie of the, &c.

Now the length of land is exactly found.

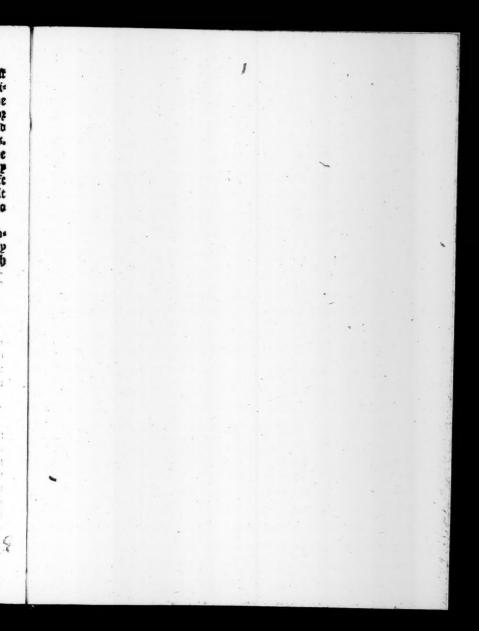
I have befoze fozgotten to admonish you whensoever pee list to measure any land exactly, by the Instrument Geometricall, named the profitable Staffe, to set byzight a Rodde; the length of a Pearch. Ozif the distance be long, to passe out, oz rather justly mere sive oz moe Pearches, at the end oz head of pour length, the extremes noted with two visible markes. Then goe from thence, and seeke the lengths by that certaine widenesse, as is beclared: so shall yet not falle to bying very true land. Rote that a little errour found on the breach, oft multiplied, encreased to a great, yea, to an intollerable fault in the length, therefoze the breacht oz widenesse ought truely to be searched. This I take sufficient soz these Crastimen.

A would belier where my grolle wittings feeme to bee obfeure, that I were prefent the Influder: for truely a lively bopte of a meme speculator somewhat practiced, furthereth tenne fold more in my sudgement, than the finest writer.

Farewell. Accept my good will, and looke Gogely (if God Spare life) for a profitable encrease of these matters.

FINIS.

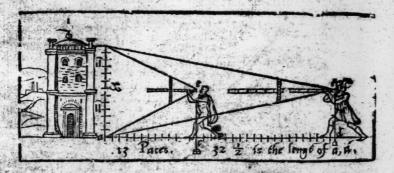
othe forwayer floolom?



BOOKE NAMED TECTONICON,

Briefly shewing the exact measuring, and speedie reckoning all manner of Land, Squares, Timber, Stone, Steeples, Pillers, Globes, & c. Further, declaring the perfect making and large vie of the Carpenters Ruler, containing a Quadrant Geometricall: comprehending also the rare vie of the Squire. And in the end a little Treatise adiopning, opening the composition and appliancy of an Instrument called the Profitable Staffe. With other things pleasant and necessary, most conducible for Sutheyers, Land-meaters, loyners,

Puplished by LEONARD DIGGES Gentleman, in the yeere of our Lord, 1556.



London. Imprinted by Felix Kingdon, 1634

1596:16-

Surprised by Colin Kington



L.D. To the Reader.



Lthough (gentle Reader) many excellent in Geometry, upon infallible grounds, have put forth divers most certaine and sufficient Rules, touching the measuring of all manner Superficies: yet in that the Art of numbring hath beene required, yea chief-

ly those Rules hid, and as it were locked up in strangs Tongues, they doe prosit (or have furthered) very little the most part: Certes nothing at all, the Land-meater, Carpenter, Mason, wanting the aforesaid. For their sakes I am here provoked not to hide, but to open, and so encrease the Talent which I have received: yea, to publish in this our Tongue very shortly (if God give life) a volumne containing the slowers of the Sciences Mathematical largely applied to our outward practise, prositably pleasant to all manner men in this Realme. In the meanetime I shall desire the Artisticers above named, to bee contented with this little Booke (a taste of my good will towards them) which I wish even so to further the Readers, as I know it (afficient for the true measuring and ready account of all manner Land, Timber, Stone, Boord, Glasse, Pausment, &c.

Here mine advice shall bee to these Artisticers that will profit in this, or any of my bookes now published, or that hereafter shall be, first confusely to reade them thorow, then with more indgement. Reade at the third reading, wittily to practise: So few things shall be unknowne. Note, oft diligent reading, soyned with ingenious

practife caufeth profitable labour.

Thus most beartily farewell (louing Reader) to whom I wish
my selse present, to surther my desire and
practice in these.

THE PLEASANT PROFIT OR

content of this little Booke, and in what it

Ther Bookes tofore put forth in our English tongue, contained onely the bare measuring of Land, Timber, and Boord: how agreeable in all places to the rules of Geometrie, let the learned judge. Here

(gentle Reader) thou shalt plainely perceive through diligent reading, how to measure truely, and very speedily all manner of Land, Timber, Stone, Steeples, Pillers, Globes, Boord, Glaffe, Pauement, &c. without any trouble: not painted with many rules, or obscure termes, nor yet with the multitude of Tables. as heretofore hath bin; in which not a few errours were committed: for that cause no iust account might any way bee had. Further, ye shall by this Booke understand the whole making and comely handling of the Carpenters Ruler, with the true measure, &c. And his vie appointed to the ready measuring of all kinde of Timber, Stone, Boord, &c. Also the levelling of grounds, and taking of heights, is pleasantly and diversly pra-Rised by the Ruler. Yee have here not the common, but the rare vie of the Square, applied to heights, lengths, &c. And to the finding of the just house of the day divers wayes, through the aide of pleafant Tablesnewly adioyned to my generall Prognoflication: by the which the proportion of things, direct or fquirewife standing, are by their shadowes knowne.

To conclude, in the end of this Booke is added a Treatife, fhewing the making, and vie of an Inftrument, by which yee shall get lengths, heights, breadths, widenesses, where or howsocuer they stand. Other necessary things are contained in this little volume, which I

Reader.



DIVERS THINGS

CONDVCIBLE TO THE ART OF MEASVRING.

The first Chapter.



b there are few Craftimen which have all the kinges of Arithmetike readily : lo 3 doe suppose none fo ias nozant, but that they boe or may ealily perceine the fimple fignificatis ons of thefe Characters or figures. 1.2.3.4.5.6.7.8.9. 10. And alfo Chiracters their ftrength in the firft, fecond, and numeralt. third romes placed.

Belides that, they mult bee familiar with thele and fuch like fractions.

1 1 1 1 1 1 1 1 4 4 co. The first lefeward betokeneth one fecond part of an whole, bee it Pearch, Inch, og any other meas Fractions. fure : the next, one third, then one feuenth part : the other enfuing one firteenth. So one thirty and two parts of an Inch. Then follow three fourths: foure fifths. The laft is nine tenths of an Inch: that is, nine parts of an Inch, biuibed into tenne portions.

Thefe I Doe intend to put in my Gramples, and in my Tables and margines following, to repre ent parts of Pearthes or Inches. As if I would write halfe an Inch, after

The Art of

this manner . Thie quarters of an inch thus . Due eight of a Bearch, on this wife . So of the reft.

It is requilite alfa beere to open what a Bearch, a Day

worke, a Roode, and an Acre is.

Although there are viners opinions engender through long custome in many places, of the length of a Wearch (byon which our chiefe matter bepenbeth) pet there is but one true Bearch by Statute appointed to meafure by. Talberin is ordaines three Berly comes by and round, to make an Inch: twelve inches, a Foot : three Foote a Pard: fiue Pares. Acre.

. a Pearch : fontie Pearches in length. and foure in breadth, an Acre. Do an Acre by flatute ought to containe 160. Pearthes; the halfe Acre 80. Pearches; a Roobe, commonly called a quarter, 40. Pearches, a Dap worke 4. Pearches. Loe beere the Acre expressed with his length and breadth.

I--- 160 1----80 -40 -20 10--16

measure with Poales. Cord knotted. Profitable Maffe.

I muft not omit heere to tell you what thing is meetelt to Infruments to measure Land with. They ble commonly in the countrey two Poales, either of them the length of a Bearch. They are bery good: pet for all kinde of Land, a Cord fine Pearches in length, well feared with ware and rolen, knotted or marked at the end of every Dearch, is more meete and readier. But in my fantalie, the instrument Beometricall, which is put forth in the end of this Booke, palleth them all and other, for the eract truth and quickelt fveed. This Inftrument is fo generall and availeable to fo funday things, that it alone requireth a large Mooke, if it Mould be lufficiently fet forth.

> Alfa I would not have you ignozant what viece of Land is called a Triangle, which often Gall bereafter bee named. It is fuch a fathioned piece as bath (or is imagined to have) three lives, and three Angles onely : whether the lives bee equall or othermile, as this figure theweth. Againe, note that a line is faid to fall Squirewife, when it cutteth any thing, or any of a Triangle full croffe, like buto a Squire : As the banging pricked

Triangle.

Line falling Squirewife.

pricked line a. b. in c.d. the bale line of the Wriangle. Lot it cutteth the fibe fquirewife, or full croffe in the point b. and not as the other line a. c. both. The vale of any Triangle is here cale led that five, which is cut fquires wife of the hanging line.

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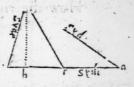
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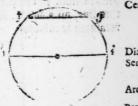
nging icked



Bafe line.

Concerning a Circle, know, that the compatte of any Circle Circle is names a Circumference: the mibble point thom bis Circumferece.

Center the right line hit. that goeth overwhare that Center couching the Circumference on both fibes is his Diameter: the balfe of that line. the Demiotameter. Alfo an Arch is a piece of the Circumference cut away: as yee fee the Arch aboue the line f.g. Alfo f.g.h.i. in this Circle



Dianieter. Semidian cter.

Arch.

arenamed paralels: for that they differequally in all places.

the one from the other.

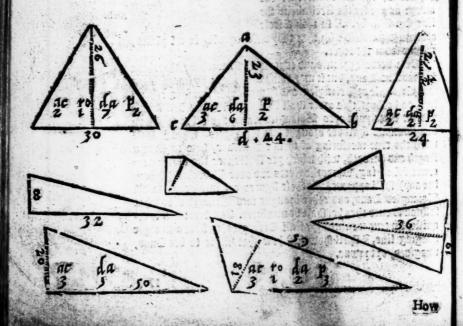
Dote because practise and experience theweth me, that there is almost no Land, but it may easily be brought by imagination to a Triangle or Triangles, and fo mott truly meafured: therefores to be those, this orber thall bee taken: I will first figure and let afore pour eyes Triangled Landy and other which by imaginations thall bee brought into Criangles. Chen I hall teach the true measuring of them: I meane, bow to finde a length and breadth, with which yee thall enter the table of account following, where the Acres and odde Bearches (if there bee any) thall appeare. As thele figures are measured, fo all Triangled Land, and other brought into Triangles, of what fathion to ever they be, thall be meatured. And becaufe it is requilite for true mealuring of all Triangles, to finde a fraight banging line, 3 wall hew fird bow that line is to bee found. imagined, or brawne,

The Art of

How the right hanging line in Triangles is drawne.

The y. Chapter.

To draw a hanging or plumbe line. This straight hanging line in all Criangles is ever drawne or imagined from any Angle, cutting some one side of that Eriangle squirewise: as pee may perceive the pricked lines in the Eriangles following. By the helpe of this line, all Lands of Eriangle fathion, are brought to bee measured as ensueth.



How to measure all manner Triangled Land.

The iij. Chapter.



F then bee an Arithmetician, multiply this Euclid the r. streight hanging line, drawne, as about is Booke 41. pro. shewed, in halfe the number of Pearches of that side, which it cutteth Squirewise. For want of the knowledge, take the aforenamed Pear-

thes (I meane of the hanging line, and halfe the five which he cutteth) and with that length and breadth enter your table of account, as there is let forth. So thall ye perceive the number of Acres, Roods, Dayworkes, &c.

Example.

Pal other, suppose the second of these last nine figures of the other side, having written about it a.b.c.d. to bee a peece of land, whereof I would have the true measure, I sinde by a Corde, otherwise, the pricked hanging line a.b. to bee 23. Pearches: the side b.c. which it cutteth squirewise 44. Pearches, whole halfe is 22. With these 22. and 23. the convenient length and breadth, I enter the table of account. There I sinde by that Cable at the corner where both the lines of convenient length and breadth doe meete 3. Acres, 6. day workes, and two pearches to be in that Criangle. Thus of all be fore sigured.

Pere note your Table must ever bee entred with all the This Table Pearches of the hanging line, and with halfe the five that bee followerb, cutteth fquirewise. De with the halfe hanging line, and the

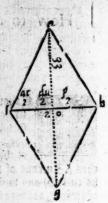
whole fice cut.

A figure

The Art of om

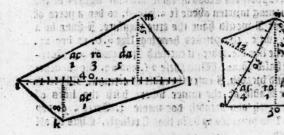
A figure of a double

This figure c.f. g.h. is but two Triangles: and therefore measured as
about in two parts. Di thus: The
hanging line c.g. is 33. Pearches: the
five f.h. that hee enteeth squiremise 20,
Pearches, the halfe of the which is 10.
Row enter your Lable as afore, with 33.
and 10. the convenient length and breadth.
So thall pre since two Acres, two Dayworkes, and two Bearches, the true content of this sigure c.f.g.h.



Figures of many Angles, Another example.

A Dmit i.k.l.in. fand to be measured. Because it'is no maner Triangle, it must be bjought by imagination, as I have said, into a Triangle of Triangles. Which imagination is beere signified by the line bathed i.l. Then as about is



beclared, it ought to bee mealured (according to the rule of Triangles) in two parts, because there are two Triangles in that land. So by proofe pe shall find in the upper i.m.l. one Acre, 3. Roodes, and fine Dayworkes: in the other i.k.l. one Acre. Thus I gather the whole content of that Land, to bee two Acres, three Roodes, and sue Dayworkes.

Jaone'

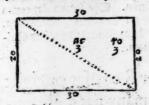
Mone otherwise of the absopned n.o.p.q. and all other fiaures following: and other whatfoeuer they are, that by any

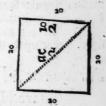
meanes may be brought into Triangles.

Furthermore know that the figure i. k. l. m. is readilp thus mealured. Abbe the Pearches of both the banging Lines together : fo haue pee 23. With this number, and with balfe the Pearches of the live, i.l. which be cutteth fquirewife, being 10. Pearches, enter pour Table. So is found as afore.

Thefe two figures following map alfo bee thus meafuret, otherwife then by the rule of Triangles. Enter pour Mable with their convenient length and breadth. So thall pou finde

the contents of all fuch.

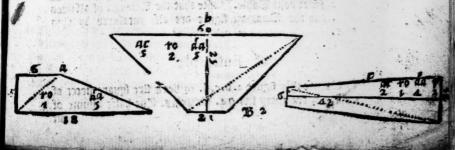




Thele three figures following, although they may be meafuren by the rule of Triangles, pet for quicker fpeebe,they baue

alfo their prover meafuring as enfueth.

Lap together the two lives which are paralels of the first figure a, that is 6, # 18.making 24.the balle is 12,the breath s. Enter with 5. and 1 2. pour table. Do baue pou one roope, and fine pay worker. For the other two b.c. and fuch like, townethe beaus or ends in one : and enter pour table with halfe of thole Bearches, and with the whole number of the mipple line.



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The Art of

ologo e navojas por ja s

How by supputation to measure all mangled land.

To measure triangled land by supputation.

I Dyne all the fives together: take halfe out of that halfe, Lynll enery live, noting the difference. Then multiply the differences, the one in the other, and the third difference augment in the product. That which encrealeth, multiply in the halfe of all the fives toyned. Then the Ravis of the furmounting fumme is the content of that Triangle.

foure rules ollowing.

Now rell foure Rules to bee treated of. The first for all manner Regular square Superficies. The second for round Land, and bee parts. The third for Steeples, Columnes, Blobes, and their parts. The last for Pountaines, and Calleyes. Here they Hall in order follow.

Arule for all manner Regular or right fquared Land of many fides, as

5.6.7.8.9.10.20.100.80.

The ity . Chapter.

To measure land of many sides.



Calues and ap all the fives together, taking the baife number of Pearches there contained. Thembrain a right hanging line from the Center of middell of that figure, or the middell of lome one five. And with that length and the

other, enter pour Table. Note that the Triangle of all fibes like, and the Quadrate figure are also measured by this rule.

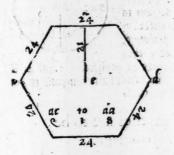
Enfample.

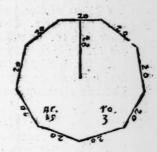
Stand, and every five a.4. Pearches. The balle fumme of

all fives is 72. Pearches: the right hanging pricked line a.c. 21. Pearches. With thele two numbers vee muft enter pour Table of account following hereafter. And boe as is opened in the veclaration there adjounce, when Rumbers furniount the Table as they doe bere.

So Wall ve finde o. Acres, 1, Rood, and 8. Dayworkes, the content of this figure a.b. c.d. Euen thus is the other nine

fquared figures mealured, and fuch like.





A Rule for round Land, and the parts thereof.

The v. Chapter.



le the Diameter multiplied in batte the Circumference, hetweth the content of any Circle.

De thus moze plainely. Dee hall encer pour Archimedesin libello circuli Cable mith halfe the number of pearches of the mensurationis. whole Circumference or compatte, and wish

the number of halfe the Diameter or breatth. So baue pee the Content

The Art of

Example.

C Mppole a prece of land, whereof the compatte is 100. Bear-Oches, the breadth 32. Bearches, 3 would know how much Land is in this ficure. Enter pour Table with balfe the com-

paffe; that to so, and with balfe the breach, that is 16. Pearches. Wecause in the Table I cannot finde 50. for the greatest length is 40. (therefore 3 enter with 40.) and 16. 90 is found foure Acres. Then I enter a. gaine with 16. Bearches remayning. and 16. the breadth as before, that



bringeth 1. Acre. Job to conclube by aboition of 1.and 4. 3 finde fine Acres in that round Land, whole halfe compaffe is 50. Dearches, and the breabth 16. Pearches.

How parts of Pearches are to be counted in measuring.

Do perfect knowledge and ble of this Mable following. when parts of Pearches are abiomed, nore well this other example that enfueth, and allo what is fato of the peclaration

annered bato the table, when parts of Pearches are in the length, breapth,or both.

Imagine f.g. h. to bee a round peece of Land: I finbe by meafure the whole Compaffe, 99. & Bearches. The halfe is 49. The banging Line on balfe breatch is Is. 2. Enter pour Cable with the whole Pearches, that is 49. and It. leas uing out 1. and 1. which were but parts of Pearches. So have



pee 4. Acres, 2. Roodes, 3. Dayworkes, and 3. Pearches. For thole parts of Pearches omitter, at pour first entring the Mable, worke thus. The halfe Bearch, Quarter, or other part of a Bearch in the length, mult bee reckoned by theme felues in the whole breath, and thole of the breath contraries wife in the length. If there bee fuch oode parts in both, then recken them of the length in the whole breatth, and them of the breadth in the whole length, topning to the other afore gotten, remembring the product of the one fraction multiplien in the other, to bee pulled from the encreale. To make this matter plaine, I will take this latt example befoge. The one number wherewith I Choulo have entred mp table, was 49. the other 15. 3. I found firft by entring with 49. and 15. (0= mitting the odde parts) 4. Acres, 2. Roodes, 2. Dayworks, and 2. Bearches. Row for the encreafe of the parts of Bearches left out, 3 muft (as 3 faid) recken them of the length in the breadth, and contrariwife them of the breadth in the length. Dalfe 15.3. is 7. Dearches, and 7. Thie quarters of 49. is 37. Bearches .. Which abbed, makes 45. Bearches. This antowned to the number aforegotten, bringeth the whole content of the round figure, which is 4. Acres, 2. Roods, 4. Days morks, 2. Pearches, and of a Pearch, the product of the one fraction multiplied in the other lubbucted. What muft be pone when the numbers wherewith pee Mould enter, ercrede pour table counfell the veclaration of your table there apropned.

Of the halfe Circle.

Pothis halfe circle, enter the Cavle with halfe the compatte, and with halfe the Diameter of the Circle, or with the length of the picked hanging line, k.l. So the content of this halfe Circle is 2. Acres, 1. Roode,



To measure halfe circled Land.

7. Day workes, 1. Pearch, and 13. of a Pearch.

Another

The Art of

Another example of Portions and parts of a Circle.

Sippole n.m.o. following, were part of a Circle of piece of Land, whole Content pee veliced. The whole compalle of the Circle which this position representeth, is (as aforesid) 99. Pearches: his Diameter of breath 31. ½. The pricked Arke of Compalle, n.m.o. is 74. Now with the halfe Breath of Seminiameter of the Circle, 15. ½ and with 37. the halfe of the wicked Compalle: enter your Table. So have yee 3. Acres, 2. Roodes, 5. Day works, 2. Pearches, and ½ of a Pearch, the Content of the piece of Land full of mickes, to the lives of the Criencle wickes.

To measure parts of circled Land.

If pe delire to know the lum of Pearches in the other postion beneath the Ariangle, feparated by the Line m.o. yee must adde the Content of the Triangle (which is 3. Roodes and \frac{1}{2}. of a Pearch, found by the Rule of Ariangles) to the Arres and Pearches before fearched. So have pe4. Acres, 1. Roode, 5. Day works, three Pearches, and \frac{1}{2}. of a Pearch.



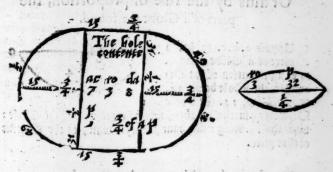
This lubilracted of pulled from the number contained in the whole Circle, the remaine is the Bearches included in the small peece beneath the Triangle. That is, 1. Roode, 36. Pearsches, and is a Bearch.

How mixed Figures are measured.

Land compounded of circles, or his parts.

Thinke none now will boubt holv these two figures following are measured, because they are made of portions or parts of Circles, whose measure is before sufficiently ope-

net, the one confifting of two balle Circles, and a Quabrane ale: the other being the portions of the Circle, m.o. boubles.



If any entil fathioned Land chance to bee meating, which requireto to be brought into many Trianglea .o faue labour, pee map abbe fome postion onto that, and make it Square, or otherwie. So let them bee mealured : and after, from the product pull away that pee added: the remaine is the Content.

To finde the content superficiall of Steeples, Columnes, Globes, and their parts.

D the Arithmetician, I fap : for picked Steeples, mul- To measure tiply the whole fibe in halfe the circumference of the Bale, Steeples, Coabbing the plaine of that Bale. For pillers : augment the Cir Globes, &c. cumference of the Bale in the Beichts, putting to the plaine of both Bales. For Globes, the diameter in the Circumference multiplied. Quen lo of fragments og parts. Let them that bee boibe of Arithmetike enter my Table of account following, with fuch numbers as I now willed the Arithmetician to multiply, not forgetting what I have before written. So A ferue their turne.

The Art of measuring

Or thus by the rule of proportion, the parts of a Globe are found.

To measure parts of Globes. Stippole a.b.c. to bee a piece of a Globe, and 4. eo be a proportion of the Disanceer, the whole being 14. Thus I say, 14. the whole



Diameter gineth 616, the Content superficiall of the Circle: what thall 4, bring: Sa have pec 176, which is the Content of that piece.

To finde the Diameter by some knowned portion thereof.

To finde the vnknowne Diameter of a Globe.

If pe bee ignozant what length the Deameter of the Globe Iis, whole proportion pee batte, the beight of part of the Demecient being 4. foot, augment halfe the line a. b. which is 6. 3. in himselfe, and the product divide by 4. So have pee 10.to be added to 4. which maketh 14. the whole Diameter.

The true measuring of Moun-

The vi. Chapter.

To measure Mountaines.



Jeffe hall measure the circuit of the Foot, of Paleurche Doumonne: Den the compage of the famility of the Alcenies, that is, the going of femilia foot to the copy, toping the measure of the longer and house in one. In our take the balle of the circuit abbed,

and the halfe part of the Alcenles toynes, and enter pon table : there thall pe fee the Content.

Enfample.

Enfample.

A.b.c. is the mountaine: a.c. the circuit of the Bale, being 100. Bearches, b.the top 16. Pearches. Which toyned tage:

ther, make 116.b.c. the one Ascense is 55. Pearches: the other 75. These added make 130. The halfe of the circuits is 58. the halfe of the Ascenses 65. with these two summes yee shallenter

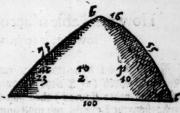


Figure of a Mountaine.

your table of account, where pe hall find 23. Acres, 2. Roodes, and 10. Prarches, the true content of this figured bill.

Of the Valley.

A sin the Pountaine pee measured the circuit of compasse Tomeasure of the Base of Foote: so here contrary pee shall meete Valleyes. round about the circuite of compasse of the height of the Callege. And aspec got the measure of compasse of the top of the Pountaine, so measure the circuite of the vepth of the Calley. In like manner as pee measured the Ascense, that is, the going by from the foote to the top: so measure the Descense of going downe of the Hill to the vepth of the Calley. The rest all worke, as I have themed you in measuring the Pountaine.

For more plainenelle, behold this enlample or figare. If yee lay together the circuites of the beight and vepth, which is 210.

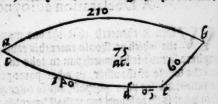


Figure of a Vailey.

and 30. taking the halfe art of thole two Circuites, making

The Art of measuring

an 120. then the two Ascentes 140, and 60, added in one proposition 200, the halfe thereof being 100, with this and 120, the other halfe of the Circuite, ye may enter your table. Chat being, loe 75. Acres.

How the Table of account now following, is to be vied.

What is to bee done when numbers, with which you should enter, exceede your Table.

Then pou batte gotten a contientent Length and Breadth (as I baue aboue beclared by biuers triangles and other figures) then pou thall enter this Cable. Seeke there the Length, and moft number of Dearches in the bigber margine, which beginneth at 1. and endeth rightward at 40. Looke the other fumme of Pearches (3 meane the breapth) in the right fibe and hanging margine, from 1. Des frending to 20. Dow at the meeting of the lines, where the one answereth the other pirectly in a square, you thall finde the Acres, Roodes, Day workes, and Pearches. Mote that the firft number fet on the left live, and bpper part in any fquare. fignifieth the number of Acres. The figure 1. fet in the boner part, and right fine, both betoken a Roobe : the figure 2. there two Roodes. 3.three Roodes. And the figure in the left fine bes neath, lignifieth a Day worke, or Day workes. A figure in the lower part richtward Declareth Bearches.

A Declaration adjoyned

Then it chanceth that the one number or both with the which pe hould enter this table, are greater then any here found: it behoweth pou to take the halfe of the one, and the whole of the other, or what parts pe list of both, most commodious for your purpole, and so enter your table. Looke then what is there found, and it shall beare his name of the parts multiplied in themselves.

Enfample.

Enfample.

Suppole the number with the which vee thould enter your table to bee 120 Pearches in length, and the breadth 60. neither of thefe may be found in the Margines : wherefore I take the third part of an 1 20, which is 34. Pearches, and one remaineth.

The halfe 60. that is 20. I finde with entring them at the Looke what I common meeting, 6. Acres, 1. Roobe, and 5. Day morkes, have shewed in This fumme must have his name of the parts augmented in the Chapter of themselves. It tooke the third part of the one, and halfe the derstand here other number, therefore 2, mult be multiplied in 3. 02 contras of whole Pearrie : fo haue ve fire which fignifieth that ve have found by en ches, left fubtring, but the firth part of the number pe thoulo finde. Tathere. Arading,&c. fore 3 muft take this fumme tofore found (being Acres, I. Roode, and 5. Day workes) fire times as much. So baue ve 23. Acres and one Roobe. For the Wearch remaining in length, reckon him in the breadth (as is afore beclared) in the fifth Chapter of the Remaines: fo bane per 60. Pearches moze to be added. So the encrease of these two numbers, 103. and 60. amount to 38. Acres, two Koodes, and 5. Day workes. Thus any manner length and breadth is reduced to this table following, which lufficeth.

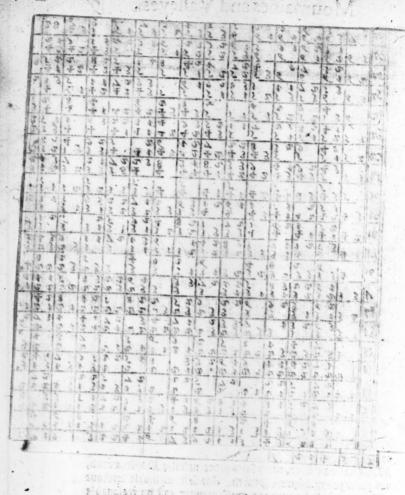
Thus with fem morbs is ended the certaine measuring of all manner Land, touching the Superficiall Contents. Wherefore now thall follow the true mealuring of Timber. Stone, Steeples, Willers, Blobes, according to their Craffitube.

Such as are altogether ignozant of Arithmetike, may reckon by our English corne, allowing for every Bearch in length 03 breatth a penny, and fo euery Barke makes an Acre, enerp Mobile balfe an Acre, euery forty pence or halfe Mobile, a rood, and every penny a fquare Bearch. And fo by memorie without tables, may in fome rube and groffe manner, caft by reasonable inft the true Contents of all Clofes, Debowes, Parthes, Dils or Gallepes. C 2

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able mag internerung genem And der neun alle errinde tale ihr tene Contents af all Clotes, Spirantes, Willelia byle er Callegie.



To the Reader.



T commeth commonly to passe, that Carpenters, Masons, and such like Artificers, are put either to measure timber euery way square, or squared logs, broader on the one side than on the other: yea many times mutilate or vnpersect stuffe. Sometimes three, fiue, tenne, or twenty, square in the head, and so through: oftentimes round

Stone or Timber with hollowed, &c. Afore I shew vnto them what must bee done with such pieces of Timber or Stone, to get their true measure, my desire shall bee that such Crastismen will leaue to be heady or selfe willed: yea so greedily to sticke to their

corrupted rules, that vtterly they refuse to be taught.

Both learning and experience declareth vnto me, that the grounds which the best of them have, are salse. To open how and where, it needeth not: neither doth it appertaine to instruction, onely it may suffice him that liketh the true way, here to receive it appointed to him. Yet to satisfie and content him which will not believe any such errours or salse grounds to bee, I say (and truely) that the Ruler of Timber measure, which the most part of them hath, is not made by right Art: Besides that, their crast in seeking the Square of some Timber is very salse. They wie in measuring, to lay the broader and narrower sides together in a summe, and to take the halse of that number for the Square. Then they seeke this votrue Square vpon the salse Ruler, and so measuring the Timber, they conclude of it vntruely.

To the Reader.

In a foote fquare is contained 172.
Inches,

As this is corrupted, so are other Grounds which they take to be infallible. Now to the purpose: touching the correction of those Errours, with other not mentioned, whereby true measuring may ensue, this way shall be taken. After I have opened how you must handle all such fashioned Timber (as afore is spoken of) there shall follow a Table in which yee may finde (as I will declare) the Square of any Stone or Timber. That knowne, it is requisite to have another Table immediately following, which may appoint to all true Squares from 1. to 6. inches, the just length to make a foote every way Square. With the length agreeable to your Square, your Logge must be measured. And as oft as ye finde it from the one end to the other of your Timber, so oft you may conclude the foot Square to bee contained in that Timber Logge, or Stone: that is, so many

Square Feet there to bee included. This Table of Timber measure standeth in the place of a good Ruler, well decked with true measures. By this yee may make or correct Rulers at pleasure, as after appeareth.

Now orderly followesh the true measuring of all fashioned.

Timber or stone aforenamed.

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How Timber or Stone fouresquare euery way, or broader on the one side than on the other, is measured.

The vij. Chapter.



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of

f a piece of Timber of Stone, bee either equally iquare, broader on the one floe, than on the other, yee hall take the intermediure, I meane, how many Inches the broader floe containeth: even so of the narrower. This done, yee must seeke in the Table of squares following, the measure of the broader side of the Tim-

ber of Stone, in the opper margine of that Table. Then looke for the number of Inches, of the equal or narrower five, in the right part and banging Pargine. At the common meeting where the one number answereth directly to the other, there pour true Square thall appeare. This square so found, thall bee referred to pour Table of Timber measure: in the which you may plainely see (if you runne downe by the lest Pargine, but it your Inches square appeare) how many freet of Inches of your Ruler belong to a foote square. As often as that measure there sound, is contained in the Timber of Stone, so often and as many freet square pee may conclude (without doubt) the piece of Timber of Stone to have.

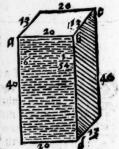
The Art of measuring

Ensample.

Suppose this squared Timber of Stone a. b.c.d. were to be measured, the broader side a. b.20. Inches, the narrower side b. c. 13. Inches, the length 40. Inches. Now I must seeke the broader side 20. in the byper Pargine of the table. The narrower side 13. must bee sound in the right side and hanging Pargine. At their common meeting 16. Inches,

and f. part of an Inch thall appeare. This true lquare must be elearched for in the table of timber measure. Therefore looke for 16. in the Pargine of this table. In the Squares with him rightward, pe hall finde 6. inches, and f. which is three quarters of an Inch. 40 Some deale less of your Ruler than 6. and f. late out doon the timber, maketh a Foote Square. And that measure so directly handled, is contained in the Length of your Timber sire

Secretary !



times. Mherefoze affirme fire Koote there to be, bestoe that is left 1/4. part of a Koote. Note because the Squares at all times (in this Ensample) rise not to even Inches, but sometime to odde parts: therefoze according to your discretion, abor or take away some part more or lesse in setting forth the Koote Square, as aboue is performed.

It were intolerable teviculnette, yea impossible to let forth the true quantities of timber measure, to all odde Quantities of Squares. The viscreete handling of these, the wittle Hall bring to a sufficient exactnesse.

Of Timber or Stone, 3.5.10.20 or moe fides Square, &c.

The vij. Chapter.

e. 10

2

ben Timber hath vivers equall Squares in the bear, and to through: first, measure all the square Roes round about the head of end of the Timber. Then take halfe the number of the whole measure for one breath.

Then measure from the Tenter (which is the middle of the bead, or end of the Timber) to the middle of the Square side, betweene the two Angles, and take the measure of that distance for the other breadth. Now reloct with the measures of these two breadths, (as tosore) to the Lable of Squares: seeing the bigger number or breadth in the opper Pargine, and the other lester in the side Pargine. With the square there found, have recourse to the Table of Timber measure, and doe as A have instructed.

Ensample.

Admit this small piece of Timber sue square, e.s.g.h. Gould bee measured, every side being 12. Inches. If ye adde together in one summe all the sue sides, they make 60. Inches. The halfe is 30. that serveth for one breadth. Then the Line c. s. which goeth from the Center or middes of the Aguare, to the middle of one side, is 8. Inches. The two number 30. and 8. must be sought (as before) in the table of squares following. At the common meeting, your square shall appeare 15. Inches, 4½. This square 15. seeke in the Table of Timber measure. There yee may see right with it



7. Anches, and 3. IRow because of 1. the odde quantitie of the Da

The Art of measuring

Square about 15. Inches, lay fomething leffe. When fee how oftentimes that measure (to with different handled) is from the one and of your Camber to the other: and affirme to many times a foote square there to be as that measure is found in the length of your Logge.

How round and hollow Timber, Steeples, Pillers, Globes, &c. arc to be measured.

The ix. Chapter.

Irst gird the Logge round about with some Line: then divide the Line which compasleth that timber in two equall parts: keepe the one part so; the bigger breath. After, ye shall divide againe that whole length (the two and twenty part cast away) in three parts, and take the halfe of one of them so

the other narrower breadth. Mith the measures of these two breadths, hade to your table, performing all things as afore is ovened.

Ensample.

Euppole this little piece of Timber, i.k.l.m. were to be measured, the compasse of girding 36. Inches, and the halfe of that is 18. being the one breadth: then the third of 36. is 12. the halfe of it is 6. which is the other narrowes breadth, with these two numbers 6. and 18. enter the Lable of squares following, and so the table of Cimber measure. At the last (all things performed as before) pee shall since in this round Logge, the length 1. m. being 18. Inches, 1. Foote, and I part of a Koote. This is sufficient for all such like.



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np be

A note of hollowed Timber.

If it chance that hollowed Timber bee to bee measured: measure the whole Logge as though it were not hollow, as about is declared. Then measure the narrower and broader sive of the hollow, and see what is contained in that, as though it were masse Timber. Now pull out the content of it, from the whole about measured: the remaine of some must shew what timber is included in that hollowed body.

Am unable in few words to erpreffe to the unlearned, by what meane Pyramidall, or picked regular Steeples of all fathions are measured. Also how Pillers, how the content of Globes or Bowles are searched, unless the Art of numbring were tasted. That being knownerthus (as now followeth) I teach.

How the crassitude of picked Steeples is knowne.

Mileight: lo pee haue the Bale in the third part of the Weight: lo pee haue the Crassitude. De multiply the Content superficials (found as I have instructed) in the Deight of the Deceple, taking so your purpose the third part of that product.

How the Content of Pillers is knowne.

E 32creale the Bale plaine in his Altitude of Beight: lo

The Art of measuring

How the Cubicall bodies of Globes are fearched.

The content Superficiall found, (as I have opened) mu be multiplied in the firth part of the Diameter: the probuct is that pee require: De the third part of the luperficial Content in halfe the Diameter. De multiply the plaine of the Circle in the whole Diameter: then take two third parts which added, make the Crassicude.

Of the halfe Circle.

IIs Superficiall Content multiplied (as I faid) bringeth the magnitude of him. If any man require ensamples of these last matters, or more sufficient handling: let them restort but omy bookes published of Geometrie, where they shall be satisfied. These little appertaine to Carpenters or Palons therefore not by ensample vectored.

A generall note.

Den thou halt bee put to measure some Body, without order of fashion, lacking part of his Square, of having more than his Forme: if it lacke thou that make it perfect, by observing diligently the running together of the fives. The parts wanting shall bee measured, as though they were there, which portions must be taken from the whole Body by measured.

Allo when there refulteth any moze than the forme or Regular Square: first mealure the square Body: then the Crassitude which aboundeth. All put together, doe shew the whole

irregular Boop. This fufficeth.

A Table to finde the iust Radix or Square of any Timber or Stone.

behoveth pou to know, that this table foiloming is made for the true square of any manner timber: thersore understand that the numbers from 1. to 40. set above in the high Pargine, betoken the Anches of the vioaver side of the timber. And the numbers from 1. and so downeward to 30. put in the right part and hanging Pargine of this table, signiste the Inches of the narrower side: and to conclude briefly, the Element or sigures set in every square roome, betoken the inst square. The bigger sigures lestward in every square place, signiste the whole Inches. And the other lesser sightward in the same square divided by a line, the parts of Inches, as \(\frac{1}{3}\), &c.

This first Fraction toward the left hand, betokeneth one halfe part of an inch: the other two fifts of an Anch, and enery figure of fraction having a point adiopned but him, some deale less than that part is: as that part, is represented frant halfe an Anch, a very little quantitie less. And if it had two prickes by him, he should have declared some quantitie more: as this other fraction of part, is which is more than two fifts,

a finall beale.

It had not been needfull to have put the parts of the Square fo precifely as they are here: neither is it requisite fo curiously to take them.

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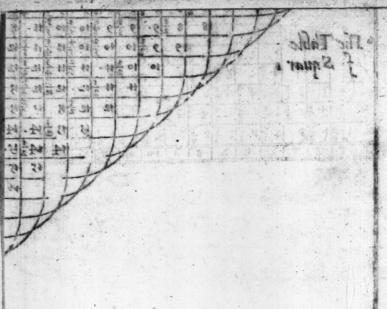
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lacethis Table betwirt D.and C.

0-11-00-12-00



The Table of Timber measure, with the declaration and vie of it.

The x. Chapter.

This Table (aspee see) is dinived into two Columnes of Rowes: the one bery short, the other longer. In the head of the sirst, I have put this word foot: in the second row, Inches, and parts to signific feet, Inches, and parts of Inches. The summes in the margine and lest part of the sirst and second columne, beclare the quantitie of the square of Timber of Scone from 1.to 3.5. Inches square. Within the rowes you map sind the sull length to a foot square, if ye enter into them in right opder accopaing to the square.

Enfample.

Suppose the square of your Timber were 7. Inches, and that per bestred to know what measure of length of the ruler would make a Foote square: seeke in the lest margine, seven Inches: and with him in that of other toward the right hand, pe half sinde 2 foote 11. Inches, and 7 of an Inch. Note because the fraction 1 hath a pricke by him, it betokeneth some small quantitie less then 7 of an Inch. If it had two prickes of points thus: 1 it should signific some sittle quantitie more. Neither maketh it matter whether per observe this pricking of no, the quantitie is so little to bee added of pulled away.

Rote what hath beene fpoken of Eimber, the lame also is to bee boverfrood of from. likewise to bee measured.

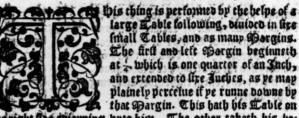
Thus is finished the measuring of Timber.

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Tables, Boord, or Glasse.

How Tables, Boords, Glasse, or any such like, are measured, according to their length and breadth, onely to the foot square.

The xi. Chapter.



the right floe arisopning buto him. The other taketh his beguiding of fire Inches, have endeth at twelve, having his proper Table allo. The third from 12-2 to 18. And so from 18. 2 to 24: from 24 2 to 30. The last Pargine is from 30.2 to

20. and there envetb.

Of this that is laid, you may gather that every Margin hach bid Cable on his right five. Also you must know that in the top, and beneath, I have put (as in the Mable of Cimiler meature) thest words, Foot, Inch, and parts, so signifie, facte, Inthes, and parts of an Anch. althenlosuer pee list to meature booth, Statle, or any other such, with the breadth of it, enter this table, and screek that breach in his proper margin; there ye shall finde in right over how many fact, Inches, or pasts of an Inth, belong to a foote square. So often as the measure is in pour statle, instead for any feete have pe in that Boozd, or such like. As the breach exceed this table, then divide the breach in parts, and works as is and shall be brelared. So the ingenious applieth this Mable for all manner brearths, und exactly.

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The Art of measuring.

Ensample.

Suppole I have a pane of Glaffe, or a Boord, whose breadth were 22 inches, the length 16. foot. In the fourth materine, I finde this breadth, 22, and the auch with it in the table rightward, I fee 6. inches, the much of my Ruler want

ting fome fmall quantity, maketh a foot.

Row because in the length of my boozd (which is 16, foote) that measure is found 29, times, and 3 parts: I conclude 29, foote there to be, and two third parts of a foote Square, according to the length and breadth I said (wanting some small quantity) because of the point to pred to this fraction 3, which is put to diminish the fraction some little thing, as is declared plainely in the other Cables before put forth.

Hop fuch like, let him onely multiply the breaoth with the length, so the product themeth the Content.

Ensample.

If there were a pavement 100. foot long, and in breadth 50. I must needs conclude by multiplication of the length in the breadth there to be contained 5000. foot.

Or thus without Arithmeticke, when the breadth exceedeth the Table.

D Juive the breadth in parts (as is opened in the Declaration of the table of account) and worke as I have before instructed. So for pavements all manner of wayes it serveth your turne. Of this matter to put forth tables, were superfluous ediculnelle and folly. The ingenious with these sew will be satisfied.

The Carpenters

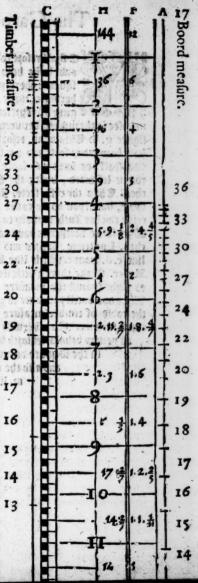
The face of the Carpenters
Ruler, figured with the
true measures, and other
things necessary.

The xy. Chapter.

Because the effect of this ruler is about veclared by tables, an instrument also well 36 knowne & common among good 33 Artisteers, I will not spend 30 many words in opening it. Be- 27 bold the figures and learne by them how yee ought to make and commonly to decke your ruler, 24 both with timber and boozd measure.

Ensample.

Annit the Ruler to bee a.b. c. d. well plained 12. Inches long, a quarter of an Inch thick and two Inches in breadth. Truely it were more commoblous, if it had two foote in length. This ruler bere ima- 17 gineb, but a foote in length is Dinibed firft in 12. euen parts 16 called inches : then every inch in balfe or two equall portis ons : each balle in two quar. ters: every quarter in foure o? 2. parts at the leaft : as in this enlample. Then are the figures placed from 1. to 12. manife: 13 fing the Inches. Thus your ruler is ready to receive the meafures which are marken or fis gured on pour Ruler thus. Abbe first the timber measure as fol-



The Carpenters Ruler.

Mattrefort to pour table of Wimber mealure, and feele bow many feete belong to one Inch fauare: there pee thall finde 144. Chis num. ber note, write, or rather graue, where this fi-John de gure i. representing one Juch, is figured as ve man fee in the miobell betweene the line c.f. and the line of the figure g. h. This done, refort to your table againe, and behold bom many feete and parts two Inches fquare requireth. Do Chall pee finde 26. foote, which is placed in the pere roome leftward . buber the Character 2. Moutfping two Inches. Chus the reft, feete, Inches, and parts, found in pour table, butill you come cothe 12. Inch, where pee thall perceine twelne Inches onely to bee fet in his proper roome, ac. Thenfeeke further in pour table tohat belongeth to 13. Inches. Loctenne Inches and ! This muft bee numbred in the line c.d. from c. which line betokeneth the thickenelle of the Ruler. Bake there a little ftrike bpon that groffenesse . enen or right against the measure 10. What nerbe many words & Thus boe butill pou come to 26. Inches, and that is noted (as the table of timber measure thewesh) that with one Inch and from c. 120 otherwife is performed of booto mealute.

as pemay behold fee forth by the beine of his proper table in the Square roomes beneath the line c. f.

and also the other thicknesse

mich librar out to the til

Clauple. Chon are the ligures stated from e. ed a d. manifer

or line b. a.

The backside of the ruler. e of Camel. with pour eye. If er

The Backfide of the Ruler, with the quadrant Geometricall.

The xin. (bapter.

Dis other figure i.k.l.m. The making of I is the backfloe of your rus quadrant, let, bauing in the middelt of Demetricall quadrant p. o. p. q. whole making in few words is this expelled. The line or breaking of your ruits rothelimo p.p.a. q.p. aught to be of one equation lemath. cutting each other funfrewife. Note thefe And from the center ni vato three principal r. is brawne another time , lines. which is called the line of beight. So is o.r. the line of feuelf. q. o. the time of beights opnicite. Chies anotone, 3 open my compatte, one foot remais ming In the center n.the other extended in the fine of fewell almost too. making a circums ference to qui, which is a poztion of a cittle names a quabrant, and ought to be binived into 90.equal parts, as pe may bebold, enery of them called a beares. Dee may bintoe the lineso.p.p.q.named the Scale fideso.p. and each in 12.48 here, or in 60 pen p.q. are called in 100 . coual portions is more the Scale. meete for the ble of habowes, beights, lengths, ec. Mote that the five or halfe Scale.o.p. is ralled the contrary madow p. p.right fliabow. Remember that byon the thicknelle mak. yez ought to have two fine equali fquare lichts mel board. reprefences bere by r. .. mabe of wood, og rather mettall to bee

The Carpenters Ruler.

The common vse of the Carpenters Ruler. touching the Face afore put forth.

The xiig. Chapter.

The eight Chap. fhewath how the true fquare is found.



El profe a piece of timber to bee moaten, mbole erue fquare is 7. Inches, this fquare appointed you to the figure of 7. in the line g. h. bnber whom rightward in the place affignento Timber mealure is waftern 2. foot, I I. Inches, .. As

often as that measure is found in the length of pour timber. fa many foote of timber is in that piece.

Another Ensample.

Bagine pour Square to bee 23. Inches : feeke in the line Lasc. Rote then bow much of pour Ruler is left from that to the end of pour Rule c: and lo much belongeth to a foote. Therefore lap out the mealure bpen pour timber, and reckon bow many times pee may finde it, from the one to the other of pour Logge : for lo many foot of timber is there. Quen thus of boord. Deeke the bredth bpon pour Ruler, in the roome or place of boord measure, and immediately before your eyes there remaineth what is to be laid out to make a full foot of booth.

The vie of the principall lines in the Geomeatricall Quadrant on the backfide of the Ruler, and first of the levell line.

. The xv. Chapter.

far liatrativation co. deput

I behoveth you to looke through your fichts q.n. placed in the thickenelle og line k. m. a fine threb and plummet falling at liberty out of the Center n. If this plummet and three chaunce pecilely on the line of leuell (which is n.o. whatfor

ener pe lee through the lights, is levell with your epe, if other-

wife the thing that yee looke buto is not levell, either moze or level then the beight or levell of your eye: Apoze, if the Plummet fall to you ward: leffe, if contrary.

How by the line of Leuell to forsee whether the water of any Spring or head is possible to bee brought to a place appointed, and also to judge the wholesomnesse of it.

The xvi. Chapter.



E hall goe to the head or Spring, and let your Ruler to your eye (being in beight equal with the water) to that the fine cord and Plummet fall precisely in the line of levell. Now if through the lights ye may fee above the place, know and

indge the water possible to be brought: if your sight fall onder, impossible. It commeth commonly to passe, when the place to the which pee would have water conveyed, is of any great distance from the head, then Pilles, Classeyes, and such like impediments, let the line visual to have his free course: where fore this remedie is provided. At the head of the spring, ye shall looke thorow the sights (as before) and note a marke in the next Pill toward the place, then goe to the marke in like manner observe another in some hill: so south butill by any of them yee may perceive the place desired. If then your sight running through the pinnes of your Ruler (the three ever falling on the Line n.o.) erceede that place, the conveying of your water is possible. Deherwise not.

Row by the way briefly yee thall bee instructed how yee may know the wholsownesse of water.

How good water is knowne.

Take a cleane pot, and put water in it: lo fet it on the fire:
after a little boyling, power it out, if then no filth remaine

The vse of the Scale.

maine in the bottome of the pot, it may bee indged the wholefomer. De thus. Let fall drops upon metall, or rather on
Glass (any of them being polithed) and luster that to die by it
felse: it after there remains no spot or ligne, it is a good token.
Poreoner, if your water bee sweete, pure, cleare, light, or of
little weight, it followeth the water to bee whole some for the
vie of man.

Of the Line of height.

Densoeuer the Theb and Plummet doe chaunce viusly on the Peight, which is n.p. the Altitude of Peight that yee see is even with the distance from the middle of your Koote, to the nether part directly under the toppe, equall with your standing, adding the Deight of your Eye powneward. Know that yee must ever stand bysight with Bodie and Necke, your Keete inst together, the one Eye closed, &c.

The line of vpright Altitudes.

Illoge also any thing plumbe byzight when the thicknesse of your Ruler i. l. is closely thereon, the plummet them at Liberty falling on q.n.named the Live of beights byzight. Row followeth the vie of the Scale.

To fearch out Heights by the Scale with the aide of two places.

The xviy. Chapter.

Tt the Theed and Plummet fall in the one, on the 12. points: in the other Station, on the 6, of the right Handow: vouble the diamee detweene the two places, the lummitie appeareth from that part of the thing measured, which is equall in Peight with your

eyr. D, the one in the 12. the other in 8. of right havow: shen triple the distance. The one in 12. the other in 6. of right Quadruplace, the space. The one in the 12. the other in 6. of right Quadruplace, the space. The one in the 12. the other in 6. of the contrary spadow, then the space betweene both the Stations is equall with that per measure, ever understanding from pour eye upward. Even that same commeth to passe, if in the one the Three bee found upon the 6, of the contrarie, in the other on the 4, of the same, or the 4, and 3. of the contrarie. In all these the spaces are equall with the Altitudes. So then in measuring the distance betweene the two places, yee have the height from your eye upward, putting to it the length from your sight downeward, the whole Aktitude appeareth: the Base being equal with your standing.

I would not have you ignozant here how to know lengths How lengths which be in height not easte to come write. For (as before) in height are get the height of the coppe, the Altitude of the Bale or long-knowns. est part of your length. Subvutt the lesse height out of the more, of force your vesired length remaineth. Or thus: Let the plummet and thred fall in the 12. Parke your place: goe in toward the thing (the thred as it was) wrill yee see the Bale of that length: the visiance between the two standings is

bndoubtedly the Length.

How with Scale direct or vpright heights by their shadowes are declared.

The xix. Chapter.

Teme pour left sive buto the Sunne, suffering his Deames to pearte both your sights q. r. placed (as afoze is said) in the thickenesse of line k.m. The Thred of Plummet then banging at libertie, out of the Center n. sheweth as well the Degrees

of

The vse of the

of height to bee counted from 0, as the parts of the Scale cutIf your theed bee found in the 12. part of line of levelt, thas
dowes of all things being perpendicular elevated, are equal
with their bodies. If the plummet with the threed bee perceined, cutting the parts nert to the lights, which I name
points of the right chadow, then every thing direct is more
then his chadow, by that proportion which 12. exceeded the
parts, where the threed was found. If it fall in 1. that is the
first part of the right chadow, take the chadow twelve times,
to make the height. In two, that is the fecond part, sire times,
in the third, foure times: in the fourth, three times: in the
fift, twice: and \(\frac{1}{3} \). of the Chadow, in the sire, twice, in the sewenth once, and \(\frac{1}{3} \). in the eight once, and \(\frac{1}{3} \): in the minth once,
and \(\frac{1}{3} \): in the tenth once, and \(\frac{1}{3} \): in the cleventh ye shall take the
Chadow once, and \(\frac{1}{3} \). Part of it.

Right shadow.

If the Art of numbing were had, I would will you to multiply the length of the hadow by 12, and the product divide by the parts, in the which pe found the threb.

Contrary flia-

But if it bee in the parts of the contrary havow, augment the length of the havow with the parts veclared by the plummet: and the increase divide them by 12. so commeth the Altitude also.

Thus the composition and whole appliance of the Carpenters Ruler is thewed: therefore somewhat thall be now said of the South.

I am not ignozant that the common vie of him, is better knowne than I can with many words express, wherefore I leave to write in that behalfe. Rotwithstanding I will beclare how heights and Lengths are taken, &c. matters rare and knowne of few Artistress.

Allo by Cables to het a true knowledge of the day houre, and that diverle wayes, with the helpe of the Squire, as is opened in my generall Prognofication, augmented in the peere of our Lord 1556.

What length the fides of thy Squire ought to bee, and the diuifion of him.

The xx. Chapter.

Reeve not to put foozth the exact making of 12 9 this Inftrument fo well knowne. Lo therefore the 3 figure. Dne libe fuppoled two foote from the inward Angle : and the other a · tuft foote from the fame. The longer a. b. inward-Ip binibed from the Augle a. onto b. into 24. equall principall parts , and eues rp of them into a leffe (if pe lift) each containing 10. minutes, alfo the Roe c.d. in the outward contrary, plaine from the top c. bn= to d. is binibed into 12. e= uen portions: and againg (if pee require eractnelle)

as

all ei=

28

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s,

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every of them into 6. each of value 10. minutes: Behold a line and plummet falling from c. to f. a Parallell to c.d. and a.b. Chus this squire is well framed for the vie of vivers Aables put forth in my generall Prognostication, and also for the finding of Altitudes and Longitudes, which here I purpose now briefly to open.

How by the Squire heights are knowne.

Attitudes or beights are found, the line or plummet centred in the lift point, cutting h. the middle of a.g. The moueable

The vie of the

moneable lights placed in a. g. of a paralell from that line not valike, as is opened of the line of beight, in the backe of my Ruler.

How Lengths in plaine Groundare fearched by the Carpenters or Ma-

The xxi. Chapter.

Ake a staffe viuived into certaine portions as pee list, in a 100. or a 1000, parts. At the beginning of your length, byon the very toppe ofrectly standing, set the inward Angle of the Squire: list by 02 put downe this instrument.

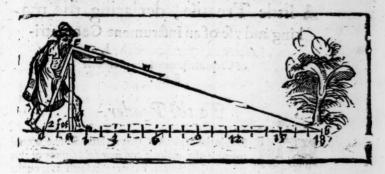
butill you ke the furthest part of your Longitude, I meane butill your sight running from that Angle, to the end of your Squire, come but the furthest part of that length. The Squire so remaining, and the Staffe not remodued from his beight. Parke where the other end of the Squire next but o you noted byon the ground. See what proportion the Staffe the beareth to the part of the ground, which the neerest end of the Squire pointed but from the Staffe: the same shall the Length have to the quantitie of the same Staffe.

Enfample.

The cause is taken out of Euclid.33. pro. 1. Booke and the 4. pro.6. booke.

The Staffe a.c. in this figure is imagined 6. Koot, and the space a.d.2. Koot. Considering now that 6. the length of the Staffe containeth 2. thice, therefore the Lougitude veliced; a. b. of some must containe three times the Staffe (which Staffe is 6. Koote) that maketh 18. Koote. As this is procued true by a small ground in the figure following: so the Art faileth not in a greater space, which the good Speculator

Speculator and villgent Practiler by any way cannot benie. Det epperience willeth me this to confeste, that the Soutre is not connenient for any long villance, but the Instrument Geometricall (whose making and vie yee may perceive in the Accatile following) valesse yee alcend some Aree or Aurret so your appe, which length knowne, shall stand in sead of your Staffe.



A' Note.

I T behooneth you to have a fine cozd, made fast in the opper part of your Staffe. c. which thall bee tyed even with the inward edge of the Squire, and so drawne to the ground, where the neere end of the Squire from the Staffe pointed, as ye see, d.c. the other end then truly directing to the furthest visiance.

Know that the ground muft be bery plaine and leuell, others

wife erroz enfueth.

Thus the ble of the Souire is beere somewhat veclared, but more in my generall Prognostication, yea most plentifully bereafter (God sparing life) in a Booke titled. The rare vie of the Squire in practics Mathematicall. In the which Booke profitable pleasant experiences shall be plainely opened (onely of me practice) as well of Perspective, as of the Pathematicals in generall.



A little Treatise, declaring the making and vse of an Instrument Geometricall, so farre as it furthereth the Landmeater or Carpenter, named the profitable Staffe.

To the Reader.



Said in the beginning, that no little Booke would containe the making and manifold fruites of this princely Instrument, if it were set forth as it ought to bee in his perfection. Certes the trueth enen here maketh me confesse the same: yea that there

is no Instrument so generall and profitably pleasant: Notwith-standing know (gentle Reader) that the occasion of his chiese vie and profit is not heere ministred: neither, to say the trueth, doth it appertaine to, or agree with the capacitie of such Artificers. Therefore I shall leave to intreate of his ample large vie and best making, and will set him forth in sew words: yea sufficiently for the Land-meaters capacitie or Carpenters purpose, that at the least, they may receive some kinde of fruite with the Geometrer. And in time to come (by other meanes) as I forcave. Levillar get udeclars, and there decks him with his

fee cause, I will largely declare, and there decke him with his proper beauties. Here now followeth the making, and so briefly, how he is applied for the profit of the afornamed Artificers.

The vse of the profitable Staffe. 23

The making of this profitable



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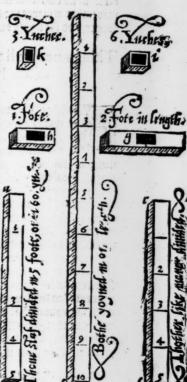
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re

ife E thall prepare two fmall, fireight, fifte, round, or rather square roos of mettall or of wad, well plained of

like bigneffe and length. Although it make no matter of what length. yet to audide the errours, which little instruments , and thort staues bring, and allo to beare with the rupe buwonted bandling of fuch Artificers : let our Robs bee each fine, or at the leaft three foote, and enerp foote biuibeb in I2. euen parts of Inches, as pee fee a.b. and c. d. Thele Robs muft bee forges with a bopce in the end of them to topne readily tenne of fite foote in length, (when time requiretb) as the figure c. f. theweth. Allo pe must get (by the belpe of some Craftiman) foure other like Robs, the longer g. 2. Foote: the next h. 1. Foote: the other 1.6. Inches, then k. 3. Inches, the last and Shortest 1. 1. Inch, and 1. Cach of thefe muft haue in their middelt a bole, that the long faffe of ten foote map bee put through them, and they moued

on bim at pleature by and downe, alwayes cutting the longer faffe c. f. Squiecwile, and made to tarry on any divition,



The vie of the

as occasion thall be given: which all are easily to bee perceived by the figure following, although my rune beclaration hath not

expresses my meaning.

Here note in the Cear of your Chart Cames, pee may have one croffe fraffe two facte long, with current lights, fo artificially made, that alwayes the Chart Caffe Chall runne fquire byon the longer, and the lights billant, as pe lift to place them.

Things needfull to be knowne before the vie of this Instrument is opened.

The ij. Chapter.

Cfore I intreate of this ble, it behooneth to know things necessary, and first which of the five little Staues g.h.i.k.l. mentioned in the making is to bee put buen your love ftaffe c. f. according to the Diflance of the marke. Dote if vour marke be neere band, be it Length, breath, or beigth, the longer g. both feeme meetelt to have the roome, if more of length, the other h, and to the further villance, the Morter the Caffe requiret to be, which Shall occupie that place. Oft mactile heweth this better than mamy mords. Alfo note, if chance bee to goe in toward your marke, (as after ve thall fee bow) you muft remoue the foot flaffe inward moze neere to the end of the longer e. If pe bee compelled to goe from it, then put it from e. toward the end f. Alfo remember when ye are appointed to measure any breadth or length (as thall be peclared) it behough you to fland right with, and against that breadth: pea, and the longer the breadth or larger the widenelle or length is, the better the thing will come to palle. And for beights it is necellary (if vee regard all precisenelle) to have the beight fland birectly bp.

Note this that followeth to be generall of

in all workings.

Y E must stand right op with your Bodie and Recke, pour feete just cogether, your hands not much moving, the one

specioled, and ever marke your fanding right with the mioft of pour feete. Bee not ignorant bere, that I call the extremes What thefe of the little faues, the berp ends where the fight euer run- words meane, neth. And no difference betweene the Altitude and height, be- Latitude, tweene the Longitude and length : the Latitude and breadth. Altitude The Bort flaues I name by the letter figured oner them. Pour epe muft ever bee placed in the end of the longer faffe c. and with the other eye pe ought to winke.

Thefe trifles and fuch like omitted, letteth the trueth to come to palle, and make mento fulpect the Ground, which is

moft certaine.

How heights standing directly vp, are measured by the instrument.

The in Chapter.

Aut the staffe g. bpon the longer c.f. and moue him his tuft length from the beginning of the longer e. turne the ends of g. toward you, and according to that beight placing your epe (as is fait) euer at the beginning of the longer e.

with the other eye winke. Then go backe untill pe may plainly perceive the very byper part of that Altitude, and also the tower end by the extremes of your thouter faffe g. Row the fpace of the mipole of your foote to the bale of the beight is equall with the Altitube.

Or thus.

When pe thall fee any Altitude, whole mealure pee require, imagine by confecture bow oftentimes that beight is found in the space from it buto pour flanding. Then moone pour thorter fafte (cholen as aboue moft convenient) euen as often his owne length from the beginning of the longer c. mbere

The vse of the

where your eye is euer placed. This done, turne the emos of your little staffe, your eye being in c. according to the height: looke whether yee may see by the extremes of your shorter the bery top, and also the lowest part of the height. If not, woue the shocker a length surther toward so neere to c. as pee see tause, and as your consecture sailed. Of let your little staffe remaine, as by consecture hee was put, and goe toward of from that height, butill the Alustude agree instep with the extremes of your short staffe. Then marke that place with the middels of your soote.

Row pe may conclude, that the beight is as often contained in the diffance, which is betweene the marke and it, as the length of that little flaffe is found remound from the end of

the longer, ac.

Enfample.

How the iust height is knowne. If the thost flaffe bee tenne times his owne length from e. affirme the beight contained inthat biflance ten times only.

The Alcitude is thus gotten. Booue your fort fraffe from bis late being a length either toward or from c. as per lift to goe in or backe. Then goe fro or neere bnto it (as before) bus till the berp fummitie, and also the lowell part of the beight acree with the extremes of pour foster faffe. The fpace then betweene pour marken place and this latter , beclareth the full beight. Ofcentimes through impediments, vee thall not baue roome to goe fo farre backe op forward, as the beight commeth buto. This remedie is prouided. Booue the httle flaffe balle bis length, and fo feeke two flations (as before) bntill the extreme of the forter flaffe bee found juftiy to ans fwere either end of the beight. Then the fpace betweene the two flandings must bee boubled to have the just beight: or if pe lift, yee may move the fhoster, according to the fourth part of his length, or to any portion, as to the fift, firt, twenty, ec. then thall per haue that part of the beight betweene the two flations.

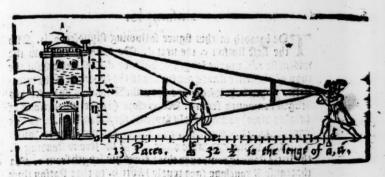
A remedy prouided for want of ground.

Det know this (which experience by biligent mactife will them) the bigger parts per take the telle errour pe commit. A

little crroz often multiplied. encredeth toa great.

Daw that all the aforespoken may the better bre perceinen. The ground of behold the crample culturing, as pre may ter by figure bectaren, this may be gain the which the height is imagined a.b. the first flation c. the thered of Eu-fhort staffe g-is moued from c. turt his length. I am forced to specitive, conclube that the Bale of the beight a.b. is from mp fanding al. Theo. e. euen bis precife length. So then if pon meafure that Difance of a.c. being 1 g. paces, pe baue the true beicht of a.b. as many. In the other flanbing place d. the fhortest flaffe is found from c. twice bis length and a balle, wherefore I mult affirme the beicht a.b. to be contained or found in the biffance a.d. twice and a halfe : which length a.d. is apparent 2 2. vaces. All this that is fnoken of the beight, may well bee buberflood of Latitudes or widenelles, and lengths following.

In Altitudes this rule is not perfect, except the eye be level! with the middle of the Altitude.



The vie of the

How the breadth or widenesse of things are found, and by them, Length or any distance aspleasure.

The tiy . Chapter.

the same unversion here of wivenesse, so, it for none otherwise are Latteuves or wivenesses seems of the searched by this Instrument, then before is veclared of beights, onely this excepted, that the short staffe must see contrary, the ends according to the breadth, seeing by the extremes of the short staffe, the very betermost parts or ends of the Lattende, noting your stations right with the midst of your foote. And so I saw, thereof the parts of the height found betweene your standings, even the same things is well bled here, for all manner parts of the hreadth.

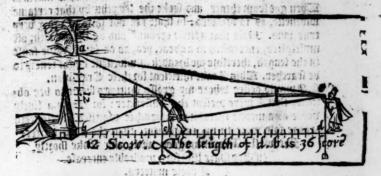
Enfample:

The breath in this figure following supposer a.b. Also
the first station c. the next d. Py vesse is to know the
wivenesse a.b. and the length of distance d.b. Parke how the
ends of the lester stanes are turned to the extremes of the wivenesse. Then behold how the shore staffe in c. is but once his
length remodued from c. Therefore (whe instructions of
beights asore) he may botoly say, that the widenesse a.b. is but
once contained betweene d. and b. and wat measure is found
12.store, as much as is the other a.b. In the second standing d.
the little staffe is removed three times his length from e. For
that cause I conclude (and truely) stom b. to that station three
times the breanth, which breakh is 12, score. So by the
wisenesse I have found the length of b.d. 36.score, my desire.
Thus are Latitudes sound, and by them lengths, ac.

Behold

t controller and service behold the figure a flotter, the

Ye must alwayes stand directly against the middle of the Breadth.



Withenfoeuer any biffance is put, whole certaine length vee require : meafure (by the are expected) either the height of any thing there found, or the breath, and fee how oftentimes that widenelle of length is contained buto your flanding : which knowne, the length cannot be hip, as is beclared.

TDw infewwords to conclude , per may by this Inferes Amore larger Dw in tem words to conclude, get ing ment measure the distance of Houses, Steeples, Arees, vic of this inthe length of Walles, the breadth of Ditches, Images in frument, height, and fuch like. The good wittie Carpenter fanbing in a place, where hee may plainely fee a whole houfe, or any manner frame with great pleafure, may by this get fpeenfly the true proportion of that boule, which hee ought to note in a Mable, and when time commeth (not without his great praile) map make, reare and let by the like. This I take to be fufficient for thele Craftimen.

Theyle of the ac.

How the length of I is exactly found. Thane before forgotten to admonith pou whenforme per lift to measure any land, exactly by the Bollrument Geometricall, named the profitable Staffe, to let voright a Roove, the length of a Bearch. Orif the visioner be long, to past mit our rathet instly mere time or mor Beardes, (at the end or bear of pour length, the extremes noted with two bisible markes. Then goe from thence, and seeke the lengths by that certains widenelle, as is beclared to that yee not talle to bring bern true land. Rote that a litels errour found on the breach, see multiplied, encrealeth to a great, yea, to an incollerable fault in the length, therefore the breach or widenelle ought critely to be searches. This I sake functions for these Crastings.

I wonto belire where mp gralle writings fermeto bee obleure, that I were prefent the Influence: for truely a finely bopce of a meme speculator somewhat practice, succeptively some sold more in my tangement, than the finest writer-

Farewell. Accept my good will, and looke though (if God ipare life) to a profitable encrease of these matters.

ell'henfoddig and offiance iconic bolode certaine length pre requires : unceffire fronte accommended effort the beight offich there; been fronte of the breasth and he bow afternmen that businesses a length in contained but a pour Containe; which that me the length in contained by a contained.

The in seident accounting, per may by this Antitut A more larger the since ence the strong the strong of Colatine of Colatine, So epise, Trees, the fide the strong of Colatine, So epise, Trees, the fide of Colatine, the strong of Colatine, So of the strong of Colatine, and the strong of the stro

The state of the s